

IMPERIAL COUNTY AIR POLLUTION CONTROL DISTRICT



**March 28, 2016
Exceptional Event Documentation
For the Imperial County PM₁₀ Nonattainment Area**

FINAL REPORT
December 10, 2018

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ACRONYM DESCRIPTIONS

AOD	Aerosol Optical Depth
AQI	Air Quality Index
AQS	Air Quality System
BACM	Best Available Control Measures
BAM 1020	Beta Attenuation Monitor Model 1020
BLM	United States Bureau of Land Management
BP	United States Border Patrol
CAA	Clean Air Act
CARB	California Air Resources Board
CMP	Conservation Management Practice
DCP	Dust Control Plan
DPR	California Department of Parks and Recreation
EER	Exceptional Events Rule
EPA	Environmental Protection Agency
FEM	Federal Equivalent Method
FRM	Federal Reference Method
GOES-W/E	Geostationary Operational Environmental Satellite (West/East)
HC	Historical Concentrations
HYSPLIT	Hybrid Single Particle Lagrangian Integrated Trajectory Model
ICAPCD	Imperial County Air Pollution Control District
INPEE	Initial Notification of a Potential Exceptional Event
ITCZ	Inter Tropical Convergence Zone
KBLH	Blythe Airport
KCZZ	Campo Airport
KIPL	Imperial County Airport
KNJK	El Centro Naval Air Station
KNYL/MCAS	Yuma Marine Corps Air Station
KPSP	Palm Springs International Airport
KTRM	Jacqueline Cochran Regional Airport (aka Desert Resorts Rgnl Airport)
PST	Local Standard Time
MMML/MXL	Mexicali, Mexico Airport
MODIS	Moderate Resolution Imaging Spectroradiometer
MPH	Miles Per Hour
MST	Mountain Standard Time
NAAQS	National Ambient Air Quality Standard
NCAR	National Center for Atmospheric Research
NCEI	National Centers for Environmental Information
NEAP	Natural Events Action Plan
NEXRAD	Next-Generation Radar
NOAA	National Oceanic and Atmospheric Administration
nRCP	Not Reasonably Controllable or Preventable
NWS	National Weather Service

PDT	Pacific Daylight Time
PM ₁₀	Particulate Matter less than 10 microns
PM _{2.5}	Particulate Matter less than 2.5 microns
PST	Pacific Standard Time
QA/QC	Quality Assured and Quality Controlled
QCLCD	Quality Controlled Local Climatology Data
RACM	Reasonable Available Control Measure
RAWS	Remote Automated Weather Station
SIP	State Implementation Plan
SLAMS	State Local Ambient Air Monitoring Station
SMP	Smoke Management Plan
SSI	Size-Selective Inlet
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UTC	Coordinated Universal Time
WRCC	Western Regional Climate Center

I Introduction

On March 28, 2016, State and Local Ambient Air Monitoring Stations (SLAMS), located in Brawley (AQS Site Code 060250007), El Centro (AQS Site Code 060251003), Niland (AQS Site Code 060254004) and Westmorland (AQS Site Code 060254003), California measured an exceedance of the National Ambient Air Quality Standard (NAAQS). The Federal Equivalent Method (FEM), Beta Attenuation Monitors Model 1020 (BAM 1020) measured (midnight to midnight) 24-hr average Particulate Matter less than 10 microns (PM₁₀) concentrations of 334 µg/m³, 284 µg/m³, 333 µg/m³, and 465 µg/m³ (**Table 1-1**). PM₁₀ 24-hr measurements above 150 µg/m³ are exceedances of the NAAQS. The SLAMS in Imperial County, except for the Calexico monitor, measured an exceedance of the PM₁₀ NAAQS on March 28, 2016.

TABLE 1-1
CONCENTRATIONS OF PM₁₀ ON MARCH 28, 2016

DATE	MONITORING SITE	AQS ID	POC(s)	HOURS	24-HOUR CONCENTRATION µg/m ³	PM ₁₀ NAAQS µg/m ³
3/28/2016	Brawley	06-025-0007	3	24	334	150
3/28/2016	El Centro	06-025-1003	4	24	284	150
3/28/2016	Niland	06-025-4004	3	20	333	150
3/28/2016	Westmorland	06-025-4003	3	22	465	150
3/28/2016	Calexico	06-025-0005	3	24	138	150

*All time referenced throughout this document is in Pacific Standard Time (PST) unless otherwise noted¹

The Imperial County Air Pollution Control District (ICAPCD) has been submitting PM₁₀ data from Federal Reference Method (FRM) Size Selective Inlet (SSI) instruments since 1986 into the United States Environmental Protection Agency's (USEPA) Air Quality System (AQS). Prior to 2013 all continuous measured PM₁₀ data was non-regulatory, thus measured in local conditions. However, by 2013 ICAPCD began formally submitting continuous FEM PM₁₀ data from BAM 1020's into the USEPA managed AQS. Because regulatory consideration of reported data must be in standard conditions, as required by USEPA, all continuous PM₁₀ data since 2013 is regulatory. On March 28, 2016, the Brawley, El Centro, Niland, and Westmorland monitors were impacted by elevated particulate matter caused by the entrainment of fugitive windblown dust from high winds caused by a cold front associated with a strong Pacific weather disturbance that moved through southeastern California and Imperial County.²

This report demonstrates that a naturally occurring event caused an exceedance observed on

¹ According to the National Institute of Standards and Technology (NIST) Time and Frequency Division the designation of the time of day for specific time zones are qualified by using the term "standard time" or "daylight time". For year-round use the designation can be left off inferring "local time" daylight or standard whichever is present. For 2016, Pacific Daylight Time (PDT) is March 13 through November 6. <https://www.nist.gov/pml/time-and-frequency-division/local-time-faq#intl>

² Area Forecast Discussion San Diego CA 859 AM PST (959 AM PDT); 101 PM PST (201 PM PDT) and Phoenix AZ 220 AM PST (320 AM MST); 101 PM PST (201 PM MST) Monday, March 28, 2016

March 11, 2016, which elevated particulate matter and affected air quality. The report provides concentration to concentration monitoring site analyses supporting a clear causal relationship between the event and the monitored exceedances and provides an analysis supporting the not reasonably controllable or preventable (nRCP) criteria. Furthermore, the report provides information that the exceedance would not have occurred without the transport of fugitive windblown dust from outlying deserts and mountains within the Sonoran Desert. The document further substantiates the request by the ICAPCD to exclude PM₁₀ 24-hour NAAQS exceedances of 334 µg/m³, 284 µg/m³, 333 µg/m³, and 465 µg/m³ (**Table 1-1**) as an exceptional event. This demonstration substantiates that this event meets the definition of the USEPA Regulation for the Treatment of Data Influenced by Exceptional Events (EER)³.

I.1 Demonstration Contents

Section II - Describes the March 28, 2016 event as it occurred in California and into Imperial County, providing background information of the exceptional event and explaining how the event affected air quality. Overall, this section provides the evidence that the event was a natural event.

Section III – Using time-series graphs, summaries and historical concentration comparisons of the Brawley, El Centro, Niland and Westmorland stations this section discusses and establishes how the March 28, 2016 event affected air quality such that a clear causal relationship is demonstrated between the event and the monitored exceedance. It is perhaps of some value to mention that the time-series graphs include PM₁₀ data measured in both local conditions and standard conditions. Measured PM₁₀ continuous data prior to 2013 is in local conditions, all other data is in standard conditions. The concentration difference between local and standard conditions has an insignificant impact on any data analysis. Overall, this section provides the evidence that human activity played little or no direct causal role in the March 28, 2016 event and its resulting emissions defining the event as a “natural event”.⁴

Section IV - Provides evidence that the event of March 28, 2016 was not reasonably controllable or preventable despite the full enforcement and implementation of Best Available Control Measures (BACM).

Section V - Brings together the evidence presented within this report to show that the exceptional event affected air quality; that the event was not reasonably controllable or preventable; that there was a clear causal relationship between the event and the exceedance, and that the event was a natural event.

³ "Treatment of Data Influenced by Exceptional Events; Final Guidance", 81 FR 68216, October 2, 2016

⁴ Title 40 Code of Federal Regulations part 50: §50.1(k) Natural event means an event and its resulting emissions, which may recur at the same location, in which human activity plays little or no direct causal role. For purposes of the definition of a natural event, anthropogenic sources that are reasonably controlled shall be considered to not play a direct role in causing emissions.

I.2 Requirement of the Exceptional Event Rule

The above sections combined comprise the technical requirements described under the Exceptional Events Rule (EER) under 40 CFR §50.14(c)(3)(iv). However, in order for the USEPA to concur with flagged air quality monitoring data, there are additional non-technical requirements.

I.2.a Public Notification that a potential event was occurring (40 CFR §50.14(c)(1))

The ICAPCD and the National Weather Service (NWS) provided an extended week to weekend notification via the ICAPCD's webpage on March 24, 2016 that a cold front would pass through the region by Monday, March 28, 2016. The San Diego and Phoenix NWS weather stories and the ICAPCD web notification advised of the possibility of strong and gusty winds through the mountains and desert regions through the weekend, with the potential for elevated particulate matter due to blowing dust. Because of the potential for suspended particles and poor air quality, the ICAPCD issued a "No Burn" day advisory for Imperial County on March 28, 2016. **Appendix A** contains copies of notices as they were issued either as forecast information prior to or on March 28, 2016.

I.2.b Initial Notification of Potential Exceptional Event (INPEE) (40 CFR §50.14(c)(2))

States are required under federal regulation to submit measured ambient air quality data into the AQS. AQS is the federal repository of Quality Assured and Quality Controlled (QA/QC) ambient air data used for regulatory purposes. When States intend to request the exclusion of one or more exceedances of a NAAQS as an exceptional event a notification to the Administrator is required. Notification occurs when an agency submits a request, which includes an initial event description, for flagging data in AQS.

On October 3, 2016, the US EPA promulgated revisions to the Exceptional Events rule, which included the requirement of an "Initial Notification of Potential Exceptional Event" (INPEE) process. This revised INPEE process requires communication between the US EPA regional office and the State, prior to the development of a demonstration. The intent of the INPEE process is twofold: to determine whether identified data may affect a regulatory decision and whether a State should develop/submit an EE Demonstration.

The ICAPCD made a formal written request to the California Air Resources Board (CARB) to place preliminary flags on SLAMS measured PM₁₀ concentrations from the all monitors, except the Calexico monitor on April 17, 2017. The INPEE, for the March 28, 2016 event, was formally submitted by the CARB to USEPA Region 9 on April 24, 2017. Subsequently there after a second revised request was sent to CARB requesting preliminary flags on additional days for 2016. **Table 1-1** above provides the PM₁₀ measured concentrations for all monitors in Imperial County on March 28, 2016. The submitted request included a brief description of the meteorological conditions for March 28, 2016 indicating that a potential natural event occurred.

I.2.c Documentation that the public comment process was followed for the event demonstration that was flagged for exclusion (40 CFR §50.14(c)(3)(v))

The ICAPCD posted, for a 30-day public review, a draft version of this demonstration on the ICAPCD webpage and published a notice of availability in the Imperial Valley Press on January 10, 2018. The published notice invited comments by the public regarding the request, by the ICAPCD, to exclude the measured concentrations of 334 $\mu\text{g}/\text{m}^3$, 284 $\mu\text{g}/\text{m}^3$, 333 $\mu\text{g}/\text{m}^3$, and 465 $\mu\text{g}/\text{m}^3$, which occurred on March 28, 2016 in Brawley, El Centro, Niland and Westmorland, respectively. The final closing date for comments was February 12, 2018. **Appendix A** contains a copy of the public notice affidavit along with any comments received by the ICAPCD for submittal as part of the demonstration (40 CFR §50.14(c)(3)(v)).

I.2.d Documentation submittal supporting an Exceptional Event Flag (40 CFR §50.14(c)(3)(i))

States that have flagged data as a result of an exceptional event and who have requested an exclusion of said flagged data are required to submit a demonstration that justifies the data exclusion to the USEPA in accordance with the due date established by USEPA during the INPEE process (40 CFR §50.14(c)(2)). Currently, bi-weekly meetings between USEPA, CARB and Imperial County continue to discuss any potential documentation of events.

The ICAPCD, after the close of the comment period and after consideration of the comments will submit this demonstration along with all required elements, including received comments and responses to USEPA Region 9 in San Francisco, California. The submittal of the March 28, 2016 demonstration will have a regulatory impact upon the development and ultimate submittal of the PM_{10} State Implementation Plan for Imperial County in 2018.

I.2.e Necessary demonstration to justify an exclusion of data under (40 CFR §50.14(c)(3)(iv))

- A This demonstration provides evidence that the event, as it occurred on March 28, 2016, satisfies the definition in 40 CFR §50.1(j) and (k) for an exceptional event.
 - a The event created the meteorological conditions that entrained emissions and caused the exceedance.
 - b The event clearly “affects air quality” such that there is the existence of a clear causal relationship between the event and the exceedance.
 - c Analysis demonstrates that the event-influenced concentrations compared to concentrations at the same monitor at other times supports the clear causal relationship.
 - d The event “is not reasonably controllable and not reasonably preventable.”
 - e The event is “caused by human activity that is unlikely to recur at a particular location or [is] a natural event.”
 - f The event is a “natural event” where human activity played little or no direct causal role.

- B This demonstration provides evidence that the exceptional event affected air quality in Imperial County by demonstrating a clear causal relationship between the event and the measured concentrations in Brawley and Westmorland.
- C This demonstration provides evidence of the measured concentrations to concentrations at the same monitor at other times supporting the clear causal relationship between the event and the affected monitor.

II March 28, 2016 Conceptual Model

This section provides a summary description of the meteorological and air quality conditions under which the March 28, 2016 event unfolded in Imperial County. The subsection elements include

- » A description and map of the geographic setting of the air quality and meteorological monitors
- » A description of Imperial County's climate
- » An overall description of meteorological and air quality conditions on the event day.

II.1 Geographic Setting and Monitor Locations

According to the United States Census Bureau, Imperial County has a total area of 4,482 square miles of which 4,177 square miles is land and 305 square miles is water. Much of Imperial County is below sea level and is part of the Colorado Desert an extension of the larger Sonoran Desert (Figure 2-1). The Colorado Desert not only includes Imperial County but a portion of San Diego County.

FIGURE 2-1
COLORADO DESERT AREA IMPERIAL COUNTY



Fig 2-1: 1997 California Environmental Resources Evaluation System. According to the United States Geological Survey (USGS) Western Ecological Research Center the Colorado Desert bioregion is part of the bigger Sonoran Desert Bioregion which includes the Colorado Desert and Upper Sonoran Desert sections of California and Arizona, and a portion of the Chihuahuan Basin and Range Section in Arizona and New Mexico (Forest Service 1994)

A notable feature in Imperial County is the Salton Sea, which is at approximately 235 feet below sea level. The Chocolate Mountains are located east of the Salton Sea and extend in a northwest-southeast direction for approximately 60 miles (**Figure 2-2**). In this region, the geology is dominated by the transition of the tectonic plate boundary from rift to fault. The southernmost strands of the San Andreas Fault connect the northern-most extensions of the East Pacific rise. Consequently, the region is subject to earthquakes and the crust is being stretched, resulting in a sinking of the terrain over time.

FIGURE 2-2
SURROUNDING AREAS OF THE SALTON SEA



Fig 2-2: Image courtesy of the Image Science and Analysis Laboratory NASA Johnson Space Center, Houston Texas

All of the seven incorporated cities, including the unincorporated township of Niland, are surrounded by agricultural fields to the north, east, west and south (**Figure 2-6**). Together, the incorporated cities, including Niland, and the agricultural fields make what is known as the Imperial Valley. Surrounding the Imperial Valley are desert areas found on the eastern and western portions of Imperial County.

The desert area, found within the western portion of Imperial County is of note because of its border with San Diego County. From west to east, San Diego County stretches from the Pacific Ocean to its boundary with Imperial County. San Diego County has a varied topography. On its western side is 70 miles (110 km) of coastline. Most of San Diego between the coast and the Laguna Mountains consists of hills, mesas, and small canyons. Snow-capped (in winter)

mountains rise to the northeast, with the Sonoran Desert to the far east. Cleveland National Forest is spread across the central portion of the county, while the Anza-Borrego Desert State Park occupies most of the northeast. The southeastern portion of San Diego County is comprised of distinctive Peninsular mountain ranges. The mountains and deserts of San Diego comprise the eastern two-thirds of San Diego County and are primarily undeveloped back country with a native plant community known as chaparral. Of the nine major mountain ranges within San Diego County, the In-Ko-Pah Mountains and the Jacumba Mountains border Mexico and Imperial County.

Both mountain ranges provide the distinctive weathered dramatic piles of residual boulders that can be seen while driving Interstate 8 from Imperial County through Devil's Canyon and In-Ko-Pah Gorge. Interstate 8 runs along the US border with Mexico from San Diego's Mission Bay to just southeast of Casa Grande Arizona.

FIGURE 2-3
JACUMBA PEAK



Fig 2-3: The Jacumba Mountains reach an elevation of 4,512 feet (1,375 m) at Jacumba Peak, near the southern end of the chain. Source: Wikipedia at https://en.wikipedia.org/wiki/Jacumba_Mountains

Northwest and northeast of the Jacumba Mountains is the Tierra Blanca Mountains, the Sawtooth Mountains and Anza-Borrego Desert State Park. Within the mountain ranges and the Anza-Borrego Desert State Park, there exists the Vallecito Mountains, the Carrizo Badlands, the Carrizo Impact Area, Coyote Mountains and the Volcanic Hills to name of few. Characteristically, these areas all have erosion that has occurred over time that extends from the Santa Rosa Mountains into northern Baja California in Mexico. For example, the Coyote Mountains consists of sand dunes left over from the ancient inland Sea of Cortez. Much of the terrain is still loose dirt, interspersed with sandstone and occasional quartz veins. The nearest community to the Coyote Mountain range is the community of Ocotillo. Of interest are the fossilized and hollowed out sand dunes that produce wind caves.

FIGURE 2-4
ANZA-BORREGO DESERT STATE PARK
CARRIZO BADLANDS



Fig 2-4: View southwest across the Carrizo Badlands from the Wind Caves in Anza-Borrego Desert State Park. Source: Wikipedia at https://en.wikipedia.org/wiki/Carrizo_Badlands

The Carrizo Badlands, which includes the Carrizo Impact Area used by the US Navy as an air-to-ground bombing range during World War II and the Korean War, lies within the Anza-Borrego Desert State Park. The Anza-Borrego Desert State Park is located within the Colorado Desert, is the largest state park in California occupying eastern San Diego County, reaching into Imperial and Riverside counties. The two communities within Anza-Borrego Desert State Park are Borrego Springs and Shelter Valley.

The Anza-Borrego Desert State Park lies in a unique geologic setting along the western margin of the Salton Trough. The area extends north from the Gulf of California to San Geronio Pass and from the eastern rim of the Peninsular Ranges eastward to the San Andreas Fault zone along the far side of the Coachella Valley. The Anza-Borrego region changed gradually over time from intermittently being fed by the Colorado River Delta to dry lakes and erosion from the surrounding mountain ranges. The area located within the southeastern and northeastern section of San Diego County is a source of entrained fugitive dust emissions that affect Imperial County when westerly winds funnel through the unique landforms causing in some cases wind tunnels that cause increases in wind speeds.

Historical observations have indicated that the desert slopes and mountains of San Diego are a source of fugitive emissions along with those deserts located to the east and west of Imperial County, which extend into Mexico (Sonoran Desert, **Figure 2-7**). Combined, the desert areas and mountains of San Diego and the desert areas that extend into Mexico are sources of dust emissions, which affect the Imperial County during high wind events.

FIGURE 2-5
ANZA-BORREGO DESERT STATE PARK
DESERT VIEW FROM FONT'S POINT



Fig 2-5: Desert view from Font's Point. Source: Font's Point Anza-Borrego Photographed by and copyright of (c) David Corby; Wikipedia at https://en.wikipedia.org/wiki/Anza-Borrego_Desert_State_Park

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FIGURE 2-7
DESERTS IN CALIFORNIA, YUMA AND MEXICO

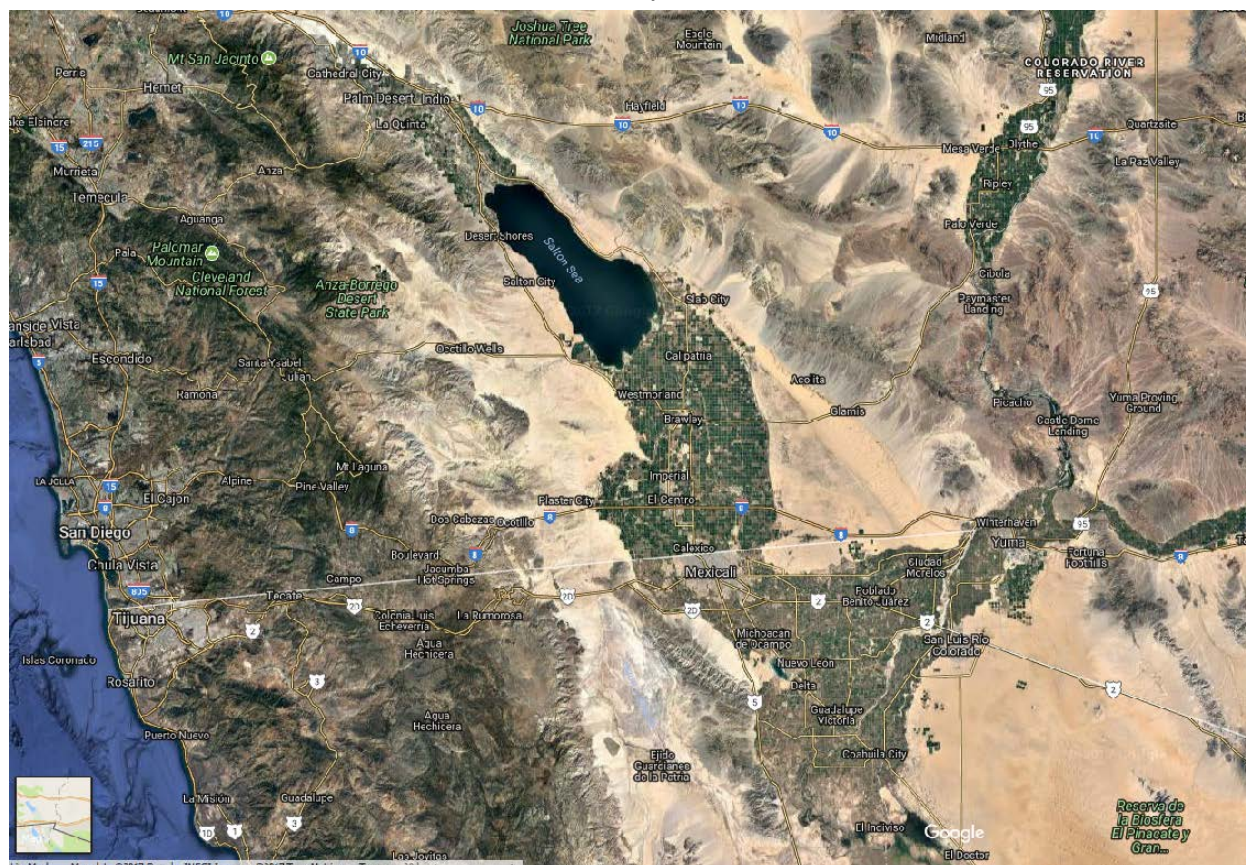


Fig 2-7: Depicts the Sonoran Desert as it extends from Mexico into Imperial County.
 Source: Google Earth Terra Metrics

The air quality and meteorological monitoring stations used in this demonstration are shown in **Figure 2-8**. Of the five SLAMS within Imperial County four stations measure both meteorological and air quality data. These SLAMS are located in Calexico, El Centro, Westmorland, and Niland; the station located in Brawley only measures air quality. Other air monitoring stations measuring air quality and meteorological data used for this demonstration include stations in eastern Riverside County, southeastern San Diego County and southwestern Arizona (Yuma County) (**Figure 2-8**).

As mentioned above, the PM_{10} exceedances on March 28, 2016, occurred at the Brawley, El Centro, Niland, and Westmorland stations. The Brawley and Westmorland stations are regarded as the “northern” monitoring sites within the Imperial County air monitoring network. In order to properly analyze the contributions from meteorological conditions occurring on March 28, 2016, other meteorological sites were used in this demonstration which include airports in eastern Riverside County, southeastern San Diego County, southwestern Arizona (Yuma County), Imperial County, and other sites relevant to the wind event, such as within northern Mexico. (**Figure 2-8**).

FIGURE 2-8
MONITORING SITES IN AND AROUND IMPERIAL COUNTY

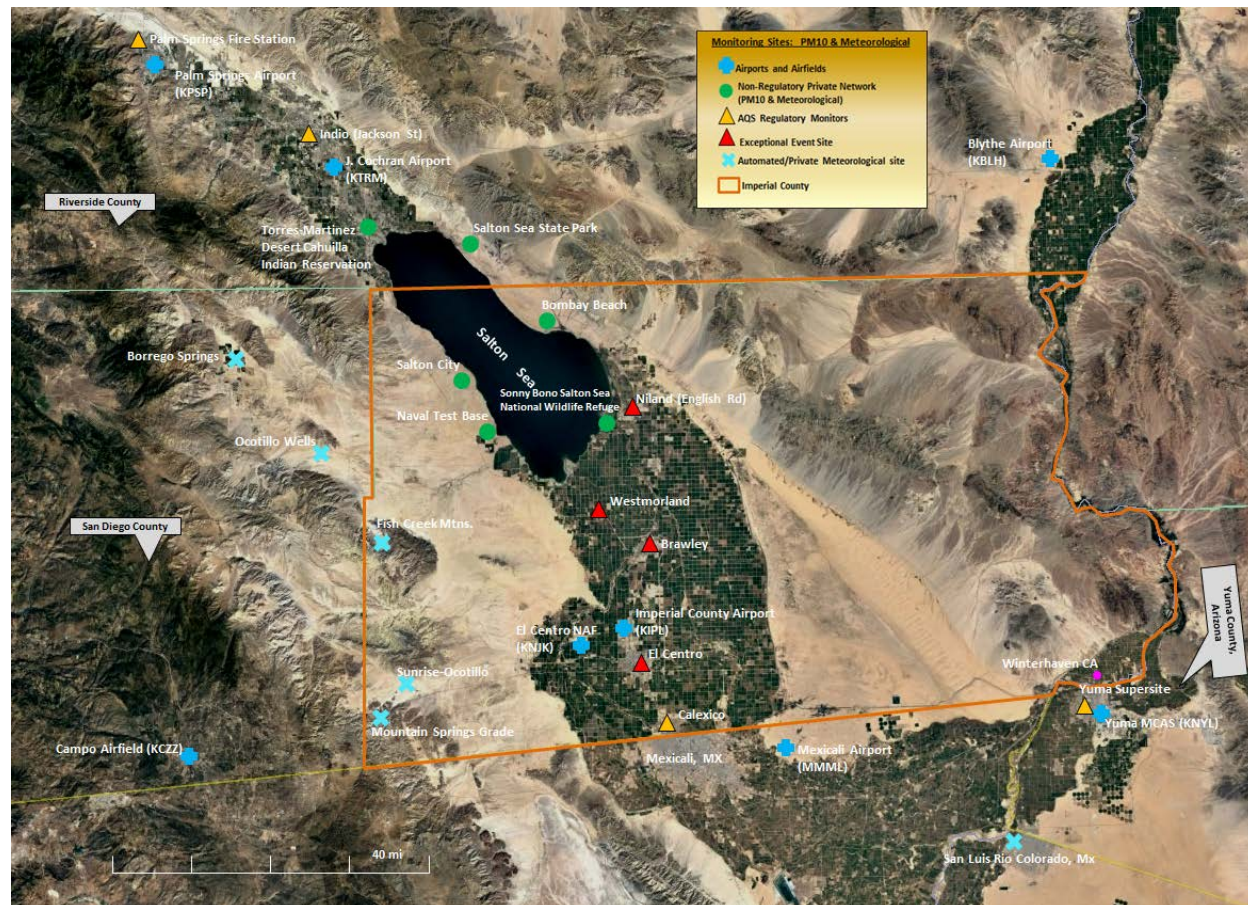


Fig 2-8: Depicts a select group of meteorological and PM₁₀ monitoring sites in Imperial County, eastern Riverside County, southeastern San Diego County, southwestern Arizona (Yuma County), and northern Mexico. The image provides the location of potential sites used to gather data in support of an Exceptional Event Demonstration. Source: Google Earth

In addition to meteorological sites, there are non-regulatory PM₁₀ sites located around the Salton Sea that maybe referenced as an aid to help the reader understand the direction and velocity of winds that affect Imperial County. Unless, otherwise specifically indicated concentration references do not imply emissions from the surrounding playa of the Salton Sea. Three sites, in specific, are the Salton City air monitoring station, the Naval Test Base air monitoring station and the Sonny Bono air monitoring station. These stations are privately owned and non-regulatory (**Figures 2-9 to 2-12**). The Salton City station is located 33.27275°N latitude and 115.90062°W longitude, on the western edge of the Salton Sea (**Figure 2-9**). The station abuts a water reservoir along the Salton Sea with surrounding chaparral vegetation and unpaved open areas and roads. The Naval Test Base station is located 33.16923°N latitude and 115.85593°W longitude, on the southwestern edge of the Salton Sea (**Figure 2-11**). The station sits on an abandoned US Military site, still owned by the Department of Defense. Unlike the Salton City station, light chaparral

vegetation and sandy open dune areas surround the Naval Test Base station. Directly to the west of the station is an orchard. The Sonny Bono station is located 33.17638°N latitude and 115.62310°W longitude, on the southern portion of the Salton Sea within the Sonny Bono Salton Sea Wildlife Refuge. The Sonny Bono Salton Sea National Wildlife Refuge is 40 miles north of the Mexican border at the southern end of the Salton Sea within the Sonoran Desert. The Refuge has two separate managed units, 18 miles apart. Each unit contains wetland habitats, farm fields, and tree rows. The land of the Salton Sea Refuge is flat, except for Rock Hill, a small, inactive volcano, located near Refuge Headquarters. Bordering the Refuge is the Salton Sea on the north and farmlands on the east, south, and west.

FIGURE 2-9
SALTON CITY AIR MONITORING STATION

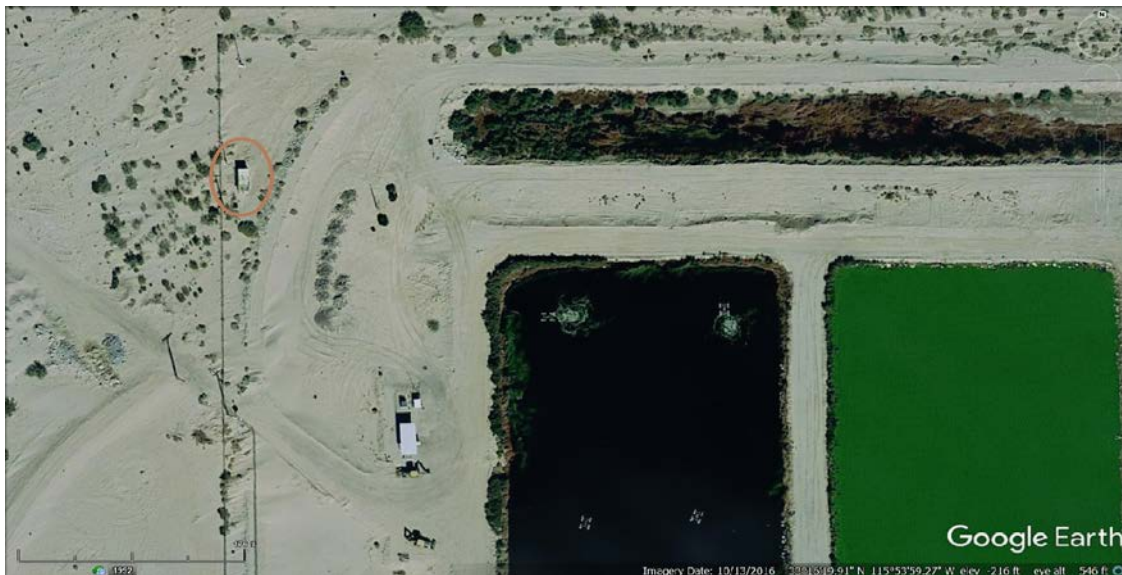


Fig 2-9: Depicts the Salton City air monitoring (circled) site operated by a private entity. Site photos can be seen at the California Air Resources Board monitoring website at https://www.arb.ca.gov/qaweb/sitephotos.php?site_no=13604&date=17

FIGURE 2-10
SALTON CITY AIR MONITORING STATION
WEST



Fig 2-10: Photograph taken by the California Air Resources Board audit team in 2017. The photograph taken from the west facing the probe.

https://www.arb.ca.gov/qaweb/sitephotos.php?site_no=13604&date=17

FIGURE 2-11
NAVAL TEST BASE AIR MONITORING STATION



Fig 2-11: Depicts the Naval Test Base air monitoring (circled) site operated by a private entity. To view the site photos visit the California Air Resources Board monitoring website at https://www.arb.ca.gov/qaweb/sitephotos.php?site_no=13603&date=17

FIGURE 2-12
NAVAL TEST BASE AIR MONITORING STATION
WEST



Fig 2-12: Photograph taken by the California Air Resources Board audit team in 2017. The photograph taken from the west facing the probe.

https://www.arb.ca.gov/qaweb/sitephotos.php?site_no=13604&date=17

FIGURE 2-13
SONNY BONO AIR MONITORING STATION



Fig 2-13: Depicts the Sonny Bono air monitoring (circled) site operated by a private entity. To view the site photos visit the California Air Resources Board monitoring website at https://www.arb.ca.gov/qaweb/sitephotos.php?site_no=13604&date=17

FIGURE 2-14
SONNY BONO SALTON SEA NATIONAL WILDLIFE REFUGE

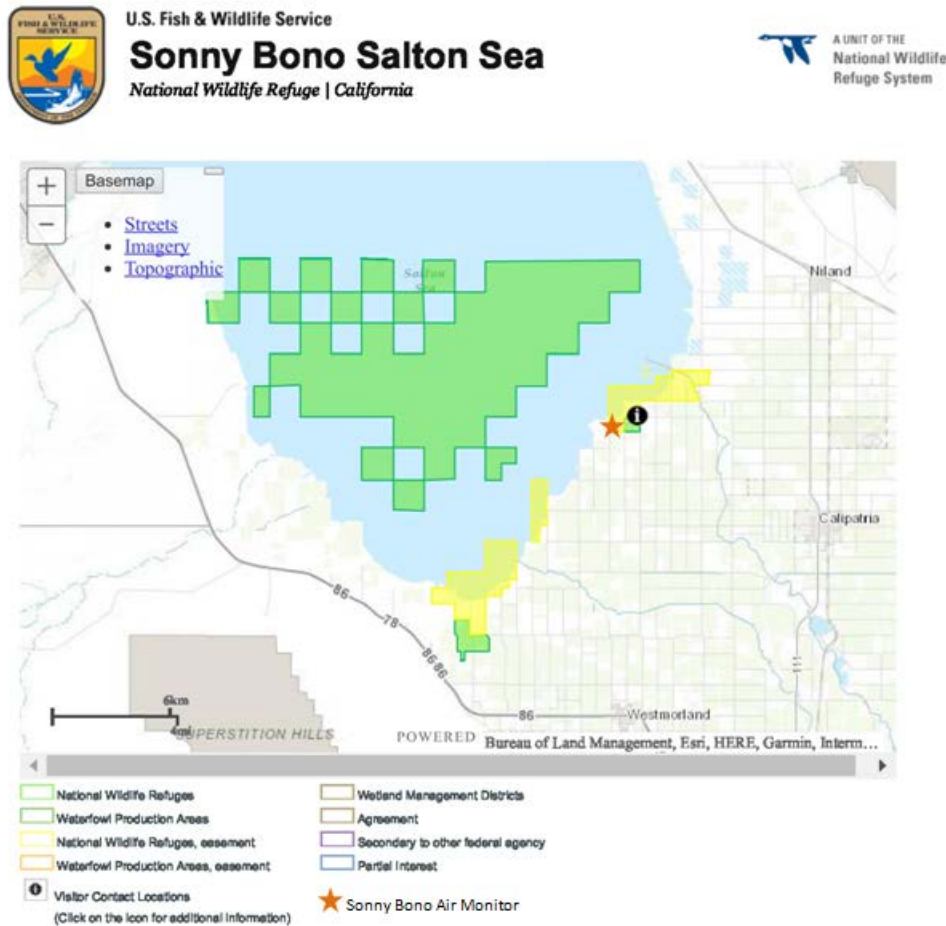


Fig 2-14: The Sonny Bono Wildlife Refuge has about 2,000 acres that are farmed and managed for wetlands. In 1998, the Refuge was renamed after Congressman Sonny Bono, who helped inform the U.S. Congress of the environmental issues facing the Salton Sea as well as acquiring funding for this Refuge to help it respond to avian disease outbreaks and other habitat challenges at the Salton Sea. Source:

https://www.fws.gov/refuge/Sonny_Bono_Salton_Sea/about.html

TABLE 2-1
MONITORING SITES IN IMPERIAL COUNTY, RIVERSIDE COUNTY AND ARIZONA
MARCH 28, 2016

Monitor Site Name	*Operator	Monitor Type	AQS ID	AQS PARAMETER CODE	ARB Site Number	Elevation (meters)	24-hr PM ₁₀ (µg/m ³) Avg	1-hr PM ₁₀ (µg/m ³) Max	**Time of Max Reading	Max Wind Speed (mph)	**Time of Max Wind Speed
IMPERIAL COUNTY											
Brawley-Main Street #2	ICAPCD	Hi-Vol Gravimetric	06-025-0007	(81102)	13701	-15	-	-	-	-	-
		BAM 1020					334	995	1500		
Calexico-Ethel Street	CARB	BAM 1020	06-025-0005	(81102)	13698	3	139	628	2300	21.9	2300
El Centro-9th Street	ICAPCD	BAM 1020	06-025-1003	(81102)	13694	9	284	995	1700	22.8	2300
Niland-English Road	ICAPCD	Hi-Vol Gravimetric	06-025-4004	(81102)	13997	-57	-	-	-	38.6	2100
		BAM 1020					334	995	1500		
Westmorland	ICAPCD	BAM 1020	06-025-4003	(81102)	13697	-43	465	995	1300	18.2	1400
RIVERSIDE COUNTY											
Palm Springs Fire Station	SCAQMD	TEOM	06-065-5001	(81102)	33137	174	54.6	194	1800	-	-
Indio (Jackson St.)	SCAQMD	TEOM	06-065-2002	(81102)	33157	1	95.6	414	1700	14	1500
ARIZONA – YUMA											
Yuma Supersite	ADEQ	TEOM	04-027-8011	(81102)	N/A	60	143	668	1900	-	-

*CARB = California Air Resources Board

*ICAPCD = Air Pollution Control District, Imperial County

*SCAQMD = South Coast Air Management Quality District

*ADEQ = Arizona Department of Environmental Quality

**Time represents the actual time/hour of the measurement in question according to the zone time (PST unless otherwise noted)

II.2 Climate

As mentioned above, Imperial County is part of the Colorado Desert, which is a subdivision of the larger Sonoran Desert (**Figure 2-15**) encompassing approximately 7 million acres (28,000 km²). The desert area encompasses Imperial County and includes parts of San Diego County, Riverside County, and a small part of San Bernardino County.

FIGURE 2-15
SONORAN DESERT REGION

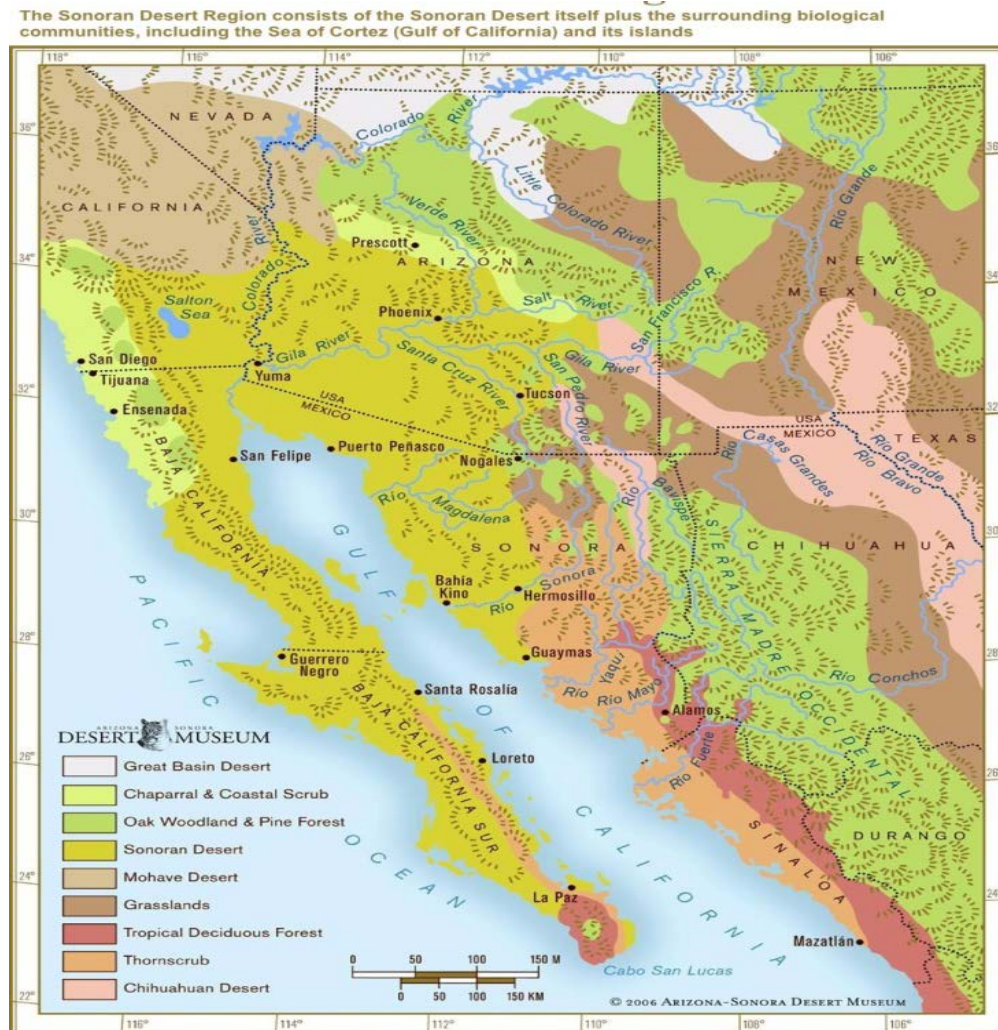


Fig 2-15: Depicts the magnitude of the region known as the Sonoran Desert. Source: Arizona-Sonora Desert Museum at <http://desertmuseum.org/center/map.php>

The majority of the Colorado Desert lies at a relatively low elevation, below 1,000 feet (300 m), with the lowest point of the desert floor at 275 feet (84 m) below sea level at the Salton Sea. Although the highest peaks of the Peninsular Range reach elevations of nearly 10,000 feet (3,000 m), most of the region's mountains do not exceed 3,000 feet (910 m).

In the Colorado Desert (Imperial County), the geology is dominated by the transition of the tectonic plate boundary from rift to fault. The southernmost strands of the San Andreas Fault connect to the northern-most extensions of the East Pacific Rise. Consequently, the region is subject to earthquakes, and the crust is being stretched, resulting in a sinking of the terrain over time.

The Colorado Desert's climate distinguishes it from other deserts. The region experiences greater summer daytime temperatures than higher-elevation deserts and almost never experiences frost. In addition, the Colorado Desert experiences two rainy seasons per year (in the winter and late summer), especially toward the southern portion of the region which includes a portion of San Diego County. The Colorado Desert portion of San Diego County receives the least amount of precipitation. Borrego Springs, the largest population center within the San Diego desert region averages 5 inches of rain with a high evaporation rate. By contrast, the more northerly Mojave Desert usually has only winter rains.

The west coast Peninsular Ranges, or other west ranges, of Southern California—northern Baja California, block most eastern Pacific coastal air and rains, producing an arid climate. Other short or longer-term weather events can move in from the Gulf of California to the south, and are often active in the summer monsoons. These include remnants of Pacific hurricanes, storms from the southern tropical jet stream, and the northern Inter Tropical Convergence Zone (ITCZ).

The arid nature of the region is demonstrated when historic annual average precipitation levels in Imperial County average 2.64" (**Figure 2-16**). During the 12-month period prior to March 28, 2016 Imperial County measured total annual precipitation of only 1.62 inches. Such arid conditions, as those preceding the event, result in soils that are particularly susceptible to particulate suspension by the elevated gusty winds.

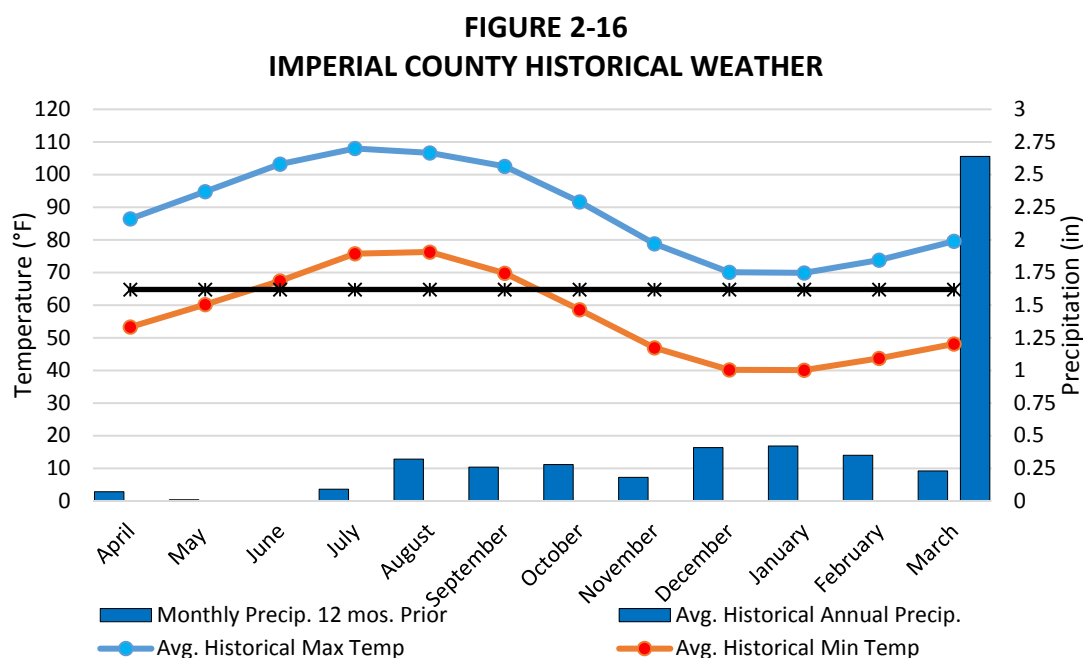


Fig 2-16: Historical Imperial County weather. Prior to March 28, 2016, the region had suffered abnormally low total precipitation of 1.62 inches. Average annual precipitation is 2.64 inches. Meteorological data courtesy of Western Regional Climate Center (WRCC) and Weather Underground <http://www.wrcc.dri.edu/cgi-bin/climain.pl?ca2713>

The NWS explains that the speed of any wind resulting from a weather system is directly proportional to the change in air pressure, called a pressure gradient, such that when the pressure gradient increases so does the speed of the wind.⁵ Because the pressure gradient is just the difference in pressure between high and low pressure areas, changes in weather patterns may recur seasonally.

Typically, high pressure brings clear skies and with no clouds there is more incoming shortwave solar radiation causing temperatures to rise. When surface winds become light, the cooling of the air produced directly under a high-pressure system can lead to a buildup of particulates in urban areas under an elongated region of relatively high atmospheric pressure or ridge causing widespread haze. Conversely, a trough is an elongated region of relatively low atmospheric pressure often associated with fronts. Troughs may be at the surface, or aloft under various conditions. Most troughs bring clouds, showers, and a wind shift, particularly following the passage of the trough.

While windblown dust events in Imperial County during the summer monsoon season are often due to outflow winds from thunderstorms, windblown dust events in the fall, winter, and spring are usually due to strong winds associated with low-pressure systems and cold fronts moving southeast across California. These winds are the result of strong surface pressure gradients between the approaching low-pressure system, accompanying cold front, and higher pressure ahead of it. As the low-pressure system and cold front approaches and passes, gusty southwesterly winds typically shift to northwesterly causing variable west winds. These strong winds entrain dust into the atmosphere and transport it over long distances, especially when soils are arid.

II.3 Event Day Summary

The exceptional event for March 28, 2016 caused when a broad upper low moved from the Gulf of Alaska into the Pacific Northwest, moving south over northern California by Monday morning then southeast across Nevada Monday night.⁶ The board circulation around the system caused a significant height fall allowing the marine layer to respond by deepening significantly to the coastal slopes as westerly winds increased within the San Diego Mountains and deserts.⁷ According to the San Diego NWS office evening update on Sunday, March 27, 2016, the onshore pressure gradients began picking up in advance of the cold upper level trough prompting the NWS to continue its Urgent Weather Message of a “High Wind Warning” but added reduced visibility to near zero due to blowing sand and dust.⁸ Similarly, the NWS Phoenix office followed suite describing the strong weather system, cold front, and associated west winds, blowing dust and sand during the early morning hours of Monday, March 28, 2016. In addition, the Phoenix

⁵ NWS JetStream – Origin of Wind <http://www.srh.noaa.gov/jetstream/synoptic/wind.html>

⁶ Area Forecast Discussion National Weather Service San Diego CA 830 PM PST (930 PM PDT) Friday March 25, 2016; 742 AM PST (842 AM PDT) Sunday, March 27, 2016; 859 AM PST (959 AM PDT); 101 PM PST (201 PM PDT) Monday, March 28, 2016

⁷ Area Forecast Discussion National Weather Service San Diego CA 300 AM PST (400 AM PDT); 742 AM PST (842 AM PDT) Sunday, March 27, 2016

⁸ Urgent Weather Message National Weather Service San Diego CA 851 PM PST (951 PM PDT) Sunday, March 27, 2016

NWS office identified the strongest winds over southeast California and southwest Arizona.⁹

Figures 2-17 through 2-19 provide information regarding the upper level trough as it moved southward and the resulting tightening of the surface gradient that caused the high west winds across southeastern California, along with the passage of the cold front.

FIGURE 2-17
UPPER LEVEL TROUGH DEEPENS

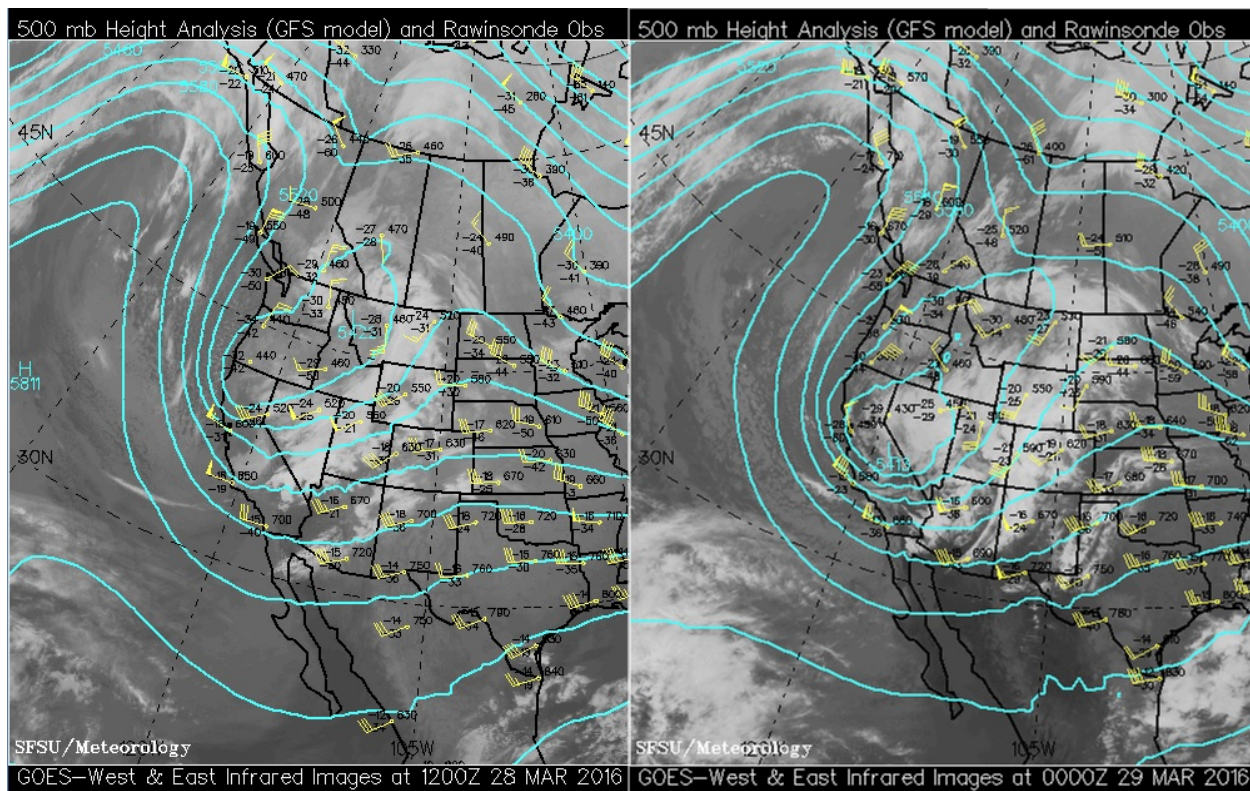


Fig 2-17: A pair of GOES E-W infrared 500mb height analysis satellite images (0400 PST, left; 1600 PST right March 28, 2016) illustrate the movement of the upper level trough as it moved southeastward over southern California. This led to the development of a surface low over southern Nevada. The development and strengthening of the surface low tightened the pressure gradient and led to the development of high west winds across southeastern California. Source: SFSU Department of Earth & Climate Sciences and the California Regional Weather Server;

http://virga.sfsu.edu/archive/composites/sathts_500/1603

⁹ Area Forecast Discussion National Weather Service Phoenix AZ 220 AM PST (320 AM MST) Monday, March 28, 2016

FIGURE 2-18
SURFACE GRADIENT REMAINS PACKED

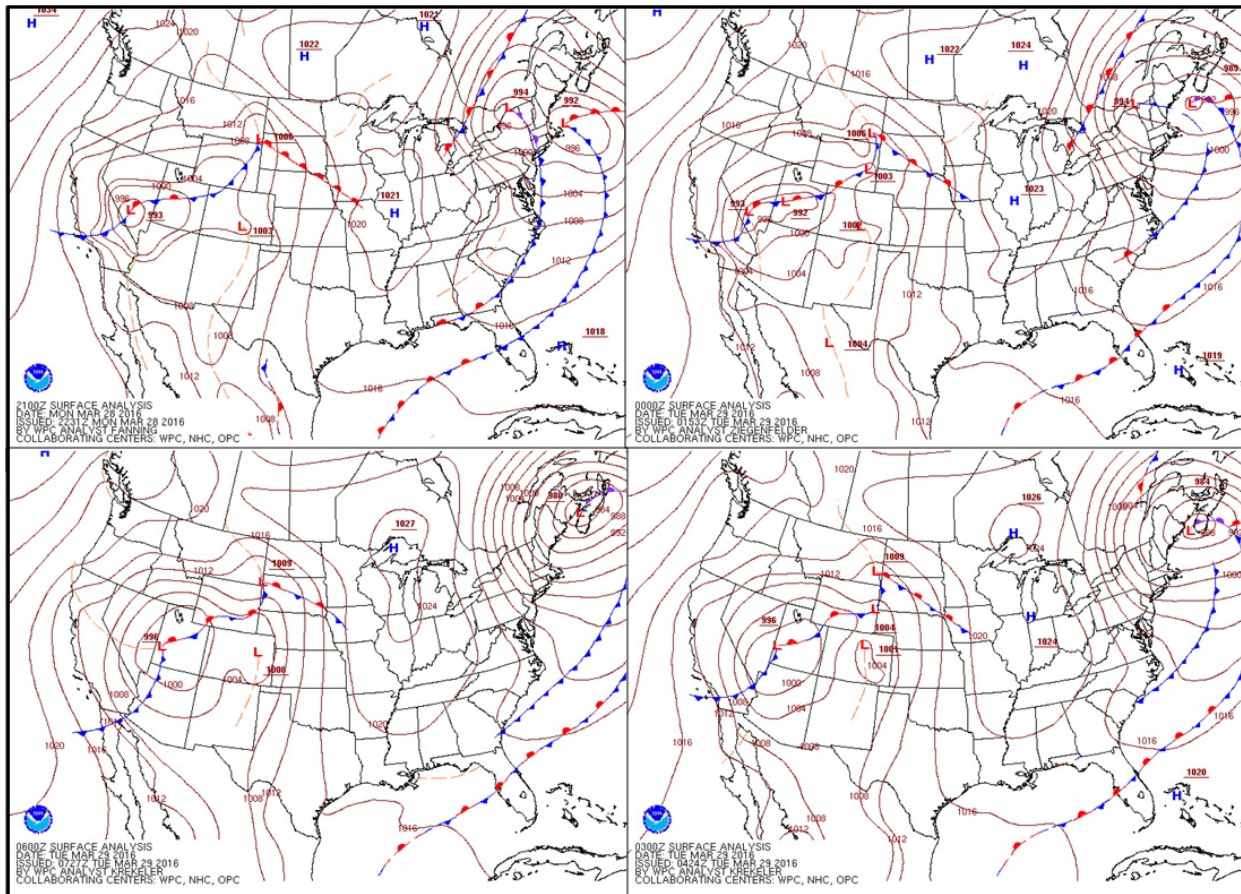


Fig 2-18: Four surface analysis maps follow the progression of the low. The gradient tightened from 1300 PST (top left) through 1600 PST (top right) on March 28, 2016. By 1900 PST the cold front was approaching southeastern California (bottom right). By 2200 PST March 28, 206 (bottom left) the cold front passed through Imperial County and the gradient was starting to relax. The high west winds transported windblown fugitive dust affecting all air monitors in Imperial County. Source: SFSU Department of Earth & Climate Sciences and the California Regional Weather Server;

http://www.wpc.ncep.noaa.gov/archives/web_pages/sfc/sfc_archive.php

FIGURE 2-19
HIGH WINDS OVER SOUTHEASTERN CALIFORNIA

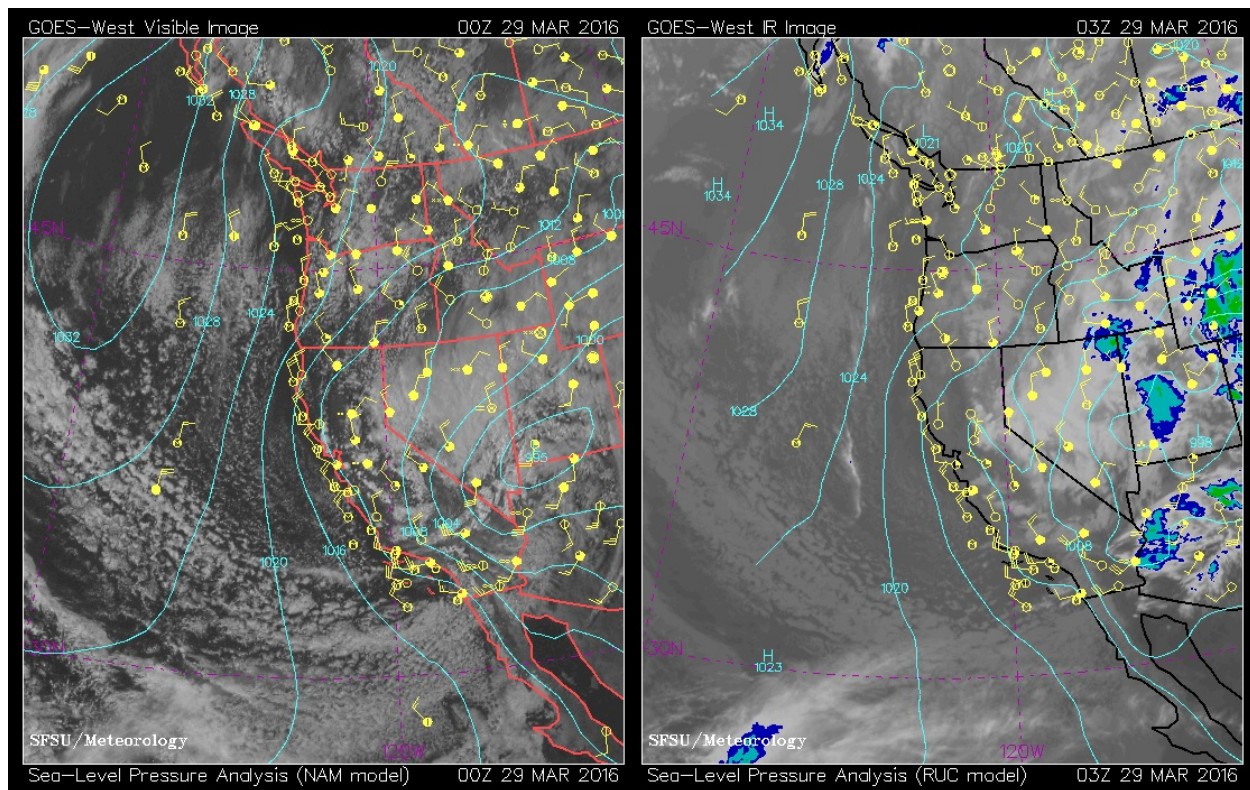


Fig 2-19: A pair of GOES-W sea level pressure analysis satellite images overlaid with wind barbs indicate westerly winds of at least 28.8 mph over southeastern California. Left is a visible satellite image captured at 1600 PST; right is infrared captured at 1900 PST. Source: SFSU Department of Earth & Climate Sciences and the California Regional Weather Server; http://squall.sfsu.edu/crws/archive/wcsathts_arch.html

Figure 2-20 is a graphical illustration of the ramp up analysis for March 28, 2016. Based on meteorological data measured at the Imperial County Airport (KIPL) and the El Centro NAF (KNJK), winds were light to moderate through 0300 PST. As winds elevated and increased in intensity there was a coincident shift in wind direction, from a southerly direction to a westerly direction, during the early dawn hours of March 28, 2016. As the Weather System continued its movement inland during the afternoon and early evening hours local airports measured peak winds of 43 mph and 52 mph. In all, KNJK measured 15 hours (12 consecutive) of winds at or above the 25 mph threshold and 18 hours of measured gusts at or above 31 mph with seven of those hours, at or above 40 mph and three hours at or above 50 mph. Similarly, KIPL measured peak winds of 39 mph and top gusts measured 51 mph. KIPL measured 17 hours (13 consecutive hours) of winds at or above the 25 mph threshold with 19 hours of measured gusts at or above 33 mph with 12 of those hours at or above 40 mph.

As mentioned above, the NWS identified the strong Weather System moving inland and associated strong westerly winds and reduced visibility due to blowing dust and sand as early as

the evening hours of Sunday, March 27, 2016. Either blowing dust or haze was in fact reported at local airports between the approximate hours of 0600 PST and 1800 PST.

FIGURE 2-20
RAMP UP ANALYSIS MARCH 28, 2016

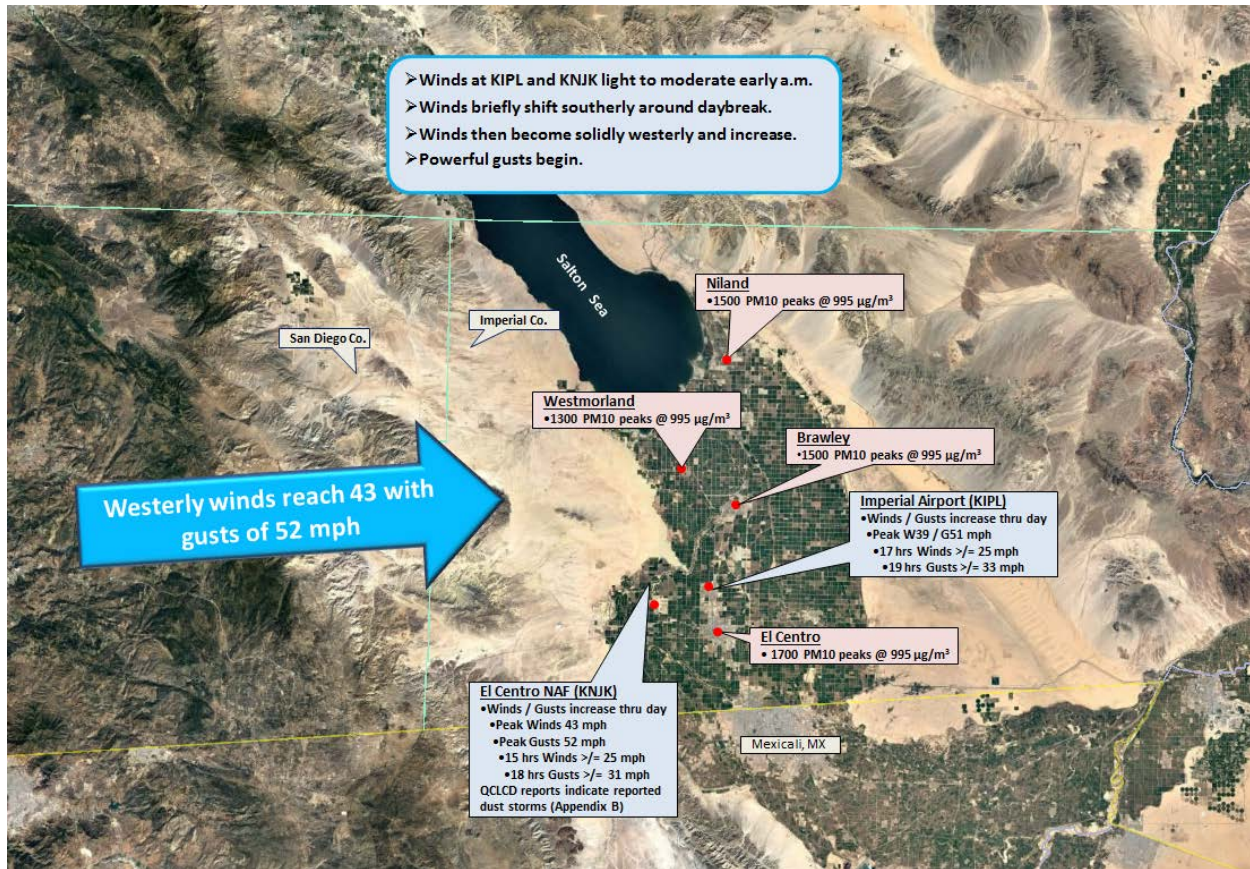


Fig 2-20: Light and variable winds switched in the early morning hours to westerly winds coincident with elevated wind speeds that continued to increase in intensity through the day and into the evening hours of March 28, 2016. Strong gusty westerly winds transported windblown fugitive dust into Imperial County affecting air quality and causing an exceedance at the Brawley, El Centro, Niland and Westmorland monitors. Air quality data from the EPA's AQS databank. Wind data from the NCEI's QCLCD system. Google Earth base map

Table 2-2 contains a summary of maximum winds, peak wind gusts, and wind direction at monitors in Imperial County, eastern Riverside County, Yuma County, Arizona, and Mexicali. For detailed meteorological station, graphs see **Appendix B**.

TABLE 2-2
WIND SPEEDS ON MARCH 28, 2016

Station Monitor Airport Meteorological Data	Maximum Wind Speed (WS) (mph)	Wind Direction during Max WS (degrees)	*Time of Max Wind Speed	24 hr Maximum Wind Gust (WG) (mph)	Time of Max WG	PM ₁₀ correlated to time of Max Wind Speed				
						Brly	El Centro	Wstmd	Calexico	Niland
IMPERIAL COUNTY										
Imperial Airport (KIPL)	39	240	2253	51	2153	153	995	791	292	949
Naval Air Facility (KNJK)	43	250	1641	52	1641	995	408	-	126	-
Calexico (Ethel St)	21.9	280	2300	-	-	133	342	312	628	-
El Centro (9th Street)	22.8	264	2300	-	-	133	342	312	628	-
Niland (English Rd)	38.6	268	2100	-	-	278	422	995	60	995
Westmorland	18.2	221	1400	-	-	691	132	995	593	617
RIVERSIDE COUNTY										
Blythe Airport (KBLH)	32	240	1852	40	1852	284	995	553	73	995
Palm Springs Airport (KPSP)	26	90	1553	40	1753	995	250	-	397	995
Jacqueline Cochran Regional Airport (KTRM) - Thermal	33	260	1552	46	1752	995	250	-	397	995
ARIZONA – YUMA										
Yuma MCAS (KNYL)	20	300	1957	30	1757	327	890	995	65	-
MEXICALI – MEXICO										
Mexicali Int. Airport (MXL)	25.3	270	1745	-	-	698	995	995	146	-

*All time referenced throughout this document is in Pacific Standard Time (PST) unless otherwise noted

The National Oceanic and Atmospheric Administration (NOAA) Air Resources Laboratory HYSPLIT back trajectory model,¹⁰ depicted in **Figures 2-20 and 2-21** indicates the general path of air as it approached Brawley (blue icon) and Westmorland (red icon).

The 6-hour back-trajectory ends at Niland, Westmorland and Brawley at 1500 PST, which falls in the middle period of when the first and last monitor measured concentrations of 995 µg/m³. Dust particles from these largely barren desert soils to the west were transported by the strong winds, impacting PM₁₀ monitors throughout southeastern California and Arizona. Trajectories help illustrate the airflow as it blew over the San Diego Mountains and through the passes onto the natural open desert floor in Imperial County. It should be noted that modeled winds differ from local conditions. Data used in the HYSPLIT model has a horizontal resolution of 12 km and is integrated every three hours. Thus, the HYSPLIT model may differ from local observed surface wind speeds and directions.

¹⁰ The Hybrid Single Particle Lagrangian Integrated Trajectory Model (**HYSPLIT**) is a computer model that is a complete system for computing simple air parcel trajectories to complex dispersion and deposition simulations. It is currently used to compute air parcel trajectories and dispersion or deposition of atmospheric pollutants. One popular use of HYSPLIT is to establish whether high levels of air pollution at one location are caused by transport of air contaminants from another location. HYSPLIT's back trajectories, combined with satellite images (for example, from NASA's [MODIS](#) satellites), can provide insight into whether high air pollution levels are caused by local air pollution sources or whether an air pollution problem was blown in on the wind. The initial development was a result of a joint effort between NOAA and Australia's Bureau of Meteorology. Source: NOAA/Air Resources Laboratory, 2011.

FIGURE 2-21
NOAA HYSPLIT MODEL MARCH 28, 2016

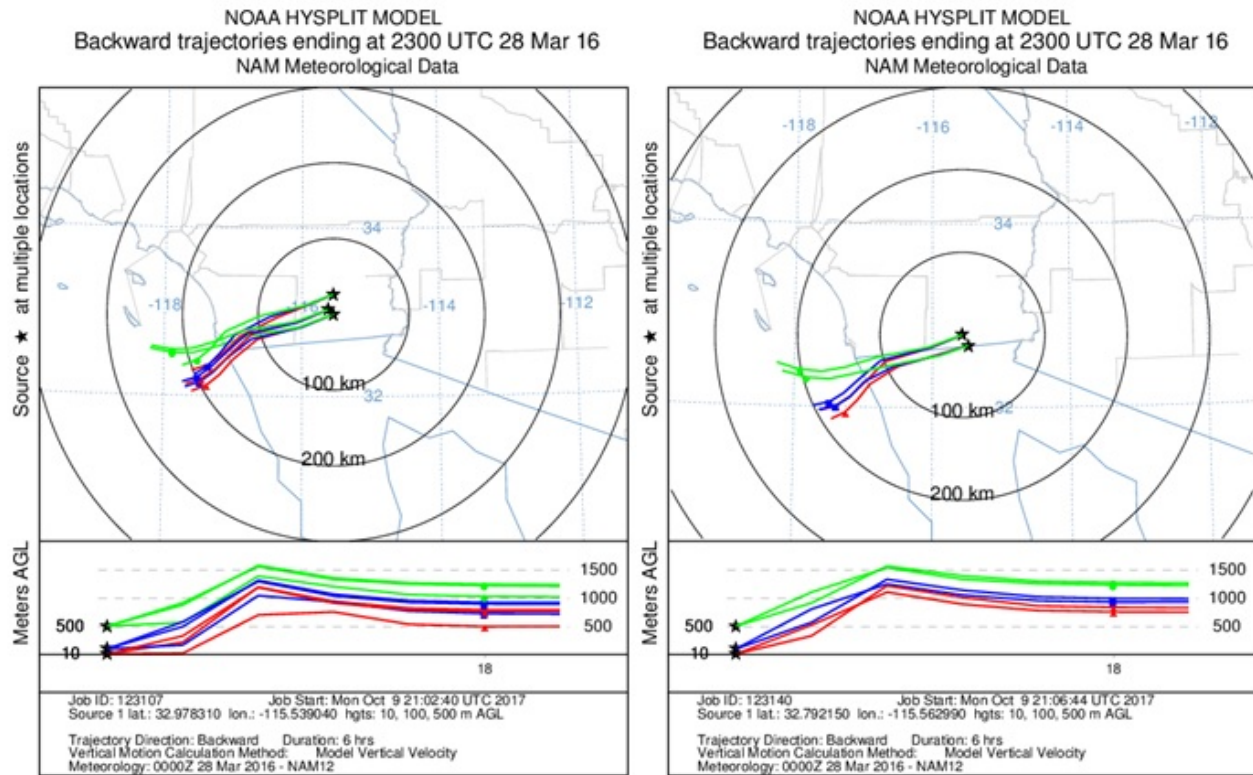


Fig 2-21: A 6-hour back trajectory ending at 1500 PST. Left image shows the back-trajectory ending at Niland, Westmorland, and Brawley. The right image shows back-trajectories ending at El Centro and Calexico (which did not exceed). Red trajectory indicates airflow at 10 meters AGL (above ground level); blue indicates airflow at 100 m; green indicates airflow at 500m. Yellow line indicates the international border. Aqua lines denote county boundaries. Dynamically generated through NOAA's Air Resources Laboratory HYSPLIT model. Base map from Google Earth

FIGURE 2-22
BASE MAP HYSPLIT MODEL MARCH 28, 2016

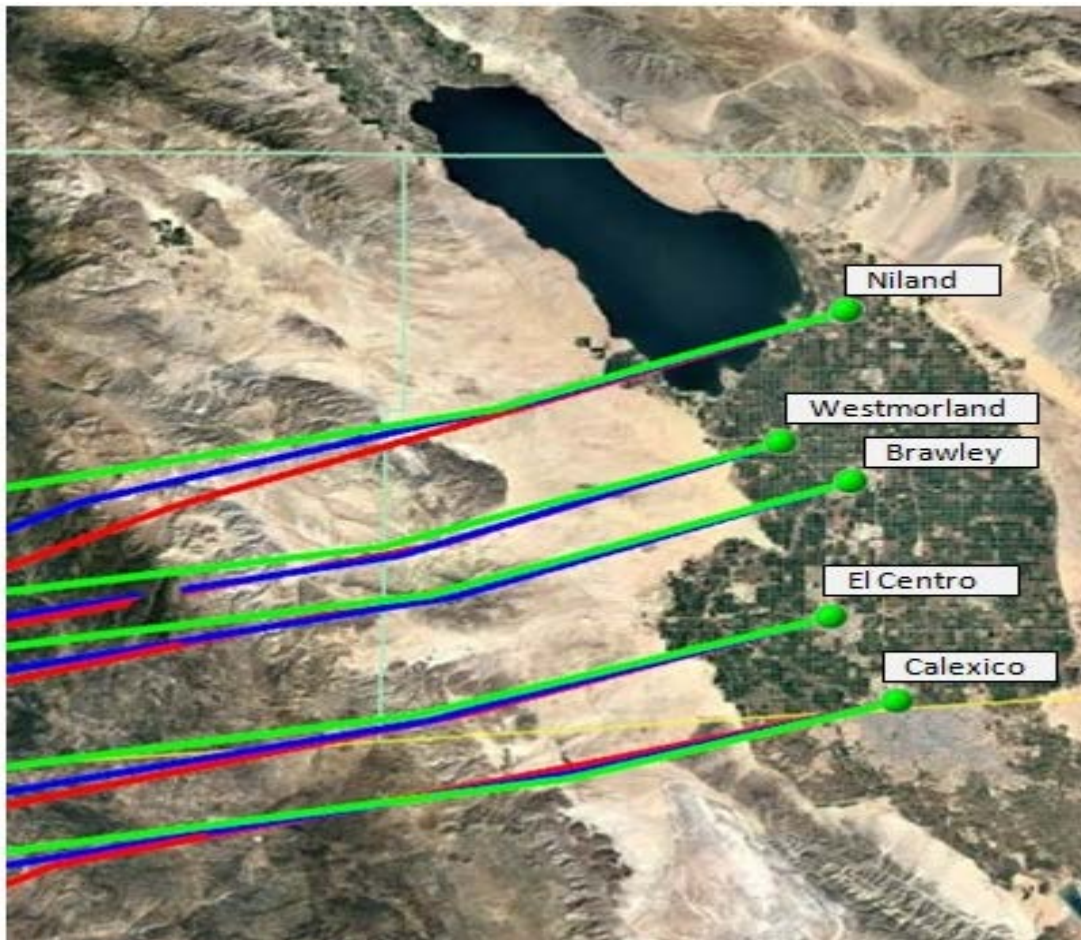


Fig 2-22: A 6-hour back trajectory ending at 1500 PST. Calexico did not exceed. Red trajectory indicates airflow at 10 meters AGL (above ground level); blue indicates airflow at 100 m; green indicates airflow at 500m. Yellow line indicates the international border. Aqua lines denote county boundaries. Dynamically generated through NOAA's Air Resources Laboratory HYSPLIT model. Base map from Google Earth

Figures 2-23 and 2-24 illustrate the winds and elevated levels of hourly PM_{10} concentrations measured in Riverside, Imperial and Yuma Counties, March 27, 2016 through March 29, 2016. Windblown dust affected the Brawley, El Centro, Niland, and Westmorland monitors when gusty westerly winds associated with the passage of a low-pressure system and cold front blew over and through the San Diego Mountains and into Imperial County on March 28, 2016. The air monitors measures the highest concentrations approximately between 1100 PST and midnight coincident with the strongest measured wind speeds and gusts.

The resulting entrained dust and accompanying high winds from the system qualify this event as a “high wind dust event”.¹¹ High wind dust events are considered natural events where the windblown dust is either from solely a natural source or from areas where anthropogenic sources of windblown dust are controlled with Best Available Control Measures (BACM). The following sections provide evidence that the March 11, 2016 high wind event qualifies as a natural event and that BACM was overwhelmed by the suddenness and intensity of the meteorological event.

FIGURE 2-23
72 HOUR WIND SPEEDS REGIONAL SITES

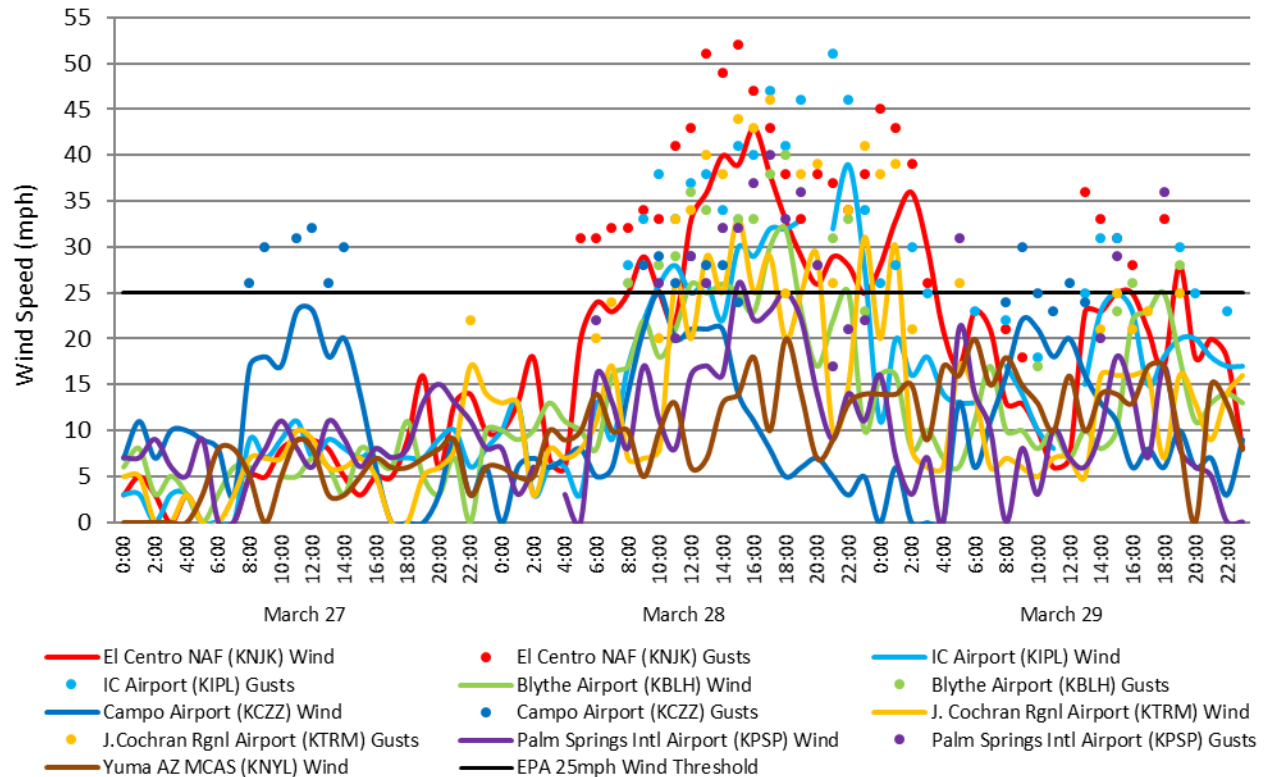


Fig 2-23: The graph illustrates the regional effect of the gusty high westerly winds. Generally, all sites begin to measure elevated winds speeds and gusts around 0600 PST. The Imperial County Airport (KIPL) and El Centro NAF (KNJK) measured winds above the 25 mph threshold. Wind Data from the NCEI’s QCLCD system. Individual wind station graphs are located in **Appendix B**

¹¹ Title 40 Code of Federal Regulations part 50: §50.1(p) High wind dust event is an event that includes the high-speed wind and the dust that the wind entrains and transports to a monitoring site.

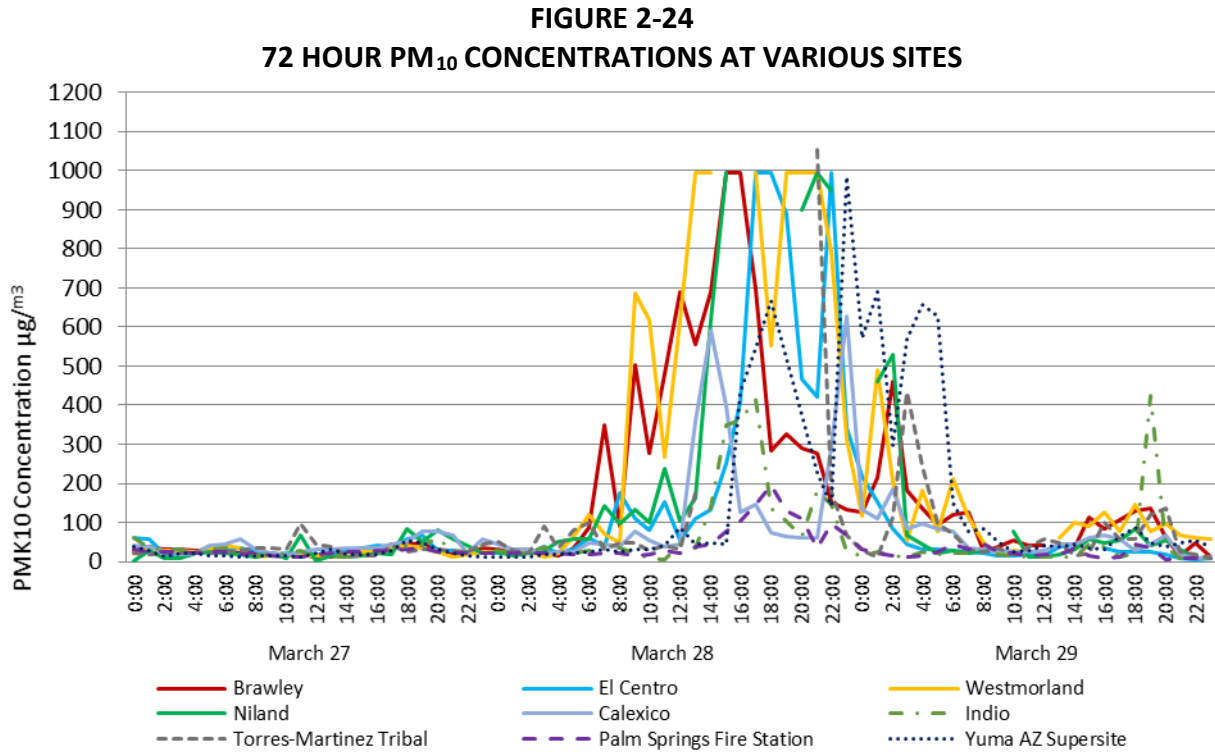


Fig 2-24: Is the graphical representation of the 72-hour relative PM₁₀ concentrations at various sites in California and Arizona. The elevated PM₁₀ concentrations at nearly all sites on March 28, 2016, demonstrate the regional impact of the weather system and accompanying winds. Air quality data from the EPA's AQS data bank

III Historical Concentrations

III.1 Analysis

While naturally occurring high wind events may recur seasonally and at times frequently and qualify for exclusion under the EER, historical comparisons of the particulate concentrations and associated winds provide insight into the frequency of events within an identified area. The following time series plots illustrate that PM₁₀ concentrations measured at the Brawley, El Centro, Niland, and Westmorland monitors on March 28, 2016, were compared to non-event and event days demonstrating the variability over several years and seasons. The analysis, also, provides supporting evidence that there exists a clear causal relationship between the March 28, 2016 high wind event and the exceedance measured at the Brawley, El Centro, Niland, and Westmorland monitors.

Figures 3-1 through 3-8 show the time series of available FRM and BAM 24-hr PM₁₀ concentrations at the Brawley, El Centro, Niland and Westmorland monitors for the period of January 1, 2010 through March 28, 2016. Note that prior to 2013, BAM data was not FEM therefore, not reported into AQS.¹² Properly establishing the variability of the event as it occurred on March 28, 2016, 24-hour averaged PM₁₀ concentrations between January 1, 2010 and March 28, 2016 were compiled and plotted as a time series. All figures illustrate that the exceedance, which occurred on March 28, 2016, were outside the normal historical concentrations when compared to event and non-event days. Air quality data for all graphs obtained through the EPA's AQS data bank.

¹² Pollutant concentration data contained in EPA's Air Quality System (AQS) are required to be reported in units corrected to standard temperature and pressure (25 C, 760 mm Hg). Because the PM₁₀ concentrations prior to 2013 were not reported into the AQS database all BAM (FEM) data prior to 2013 within this report are expressed as micrograms per cubic meter (mg/m³) at local temperature and pressure (LTP) as opposed to standard temperature and pressure (STP, 760 torr and 25 C). The difference in concentration measurements between standard conditions and local conditions is insignificant and does not alter or cause any significant changes in conclusions to comparisons of PM₁₀ concentrations to PM₁₀ concentrations with in this demonstration.

FIGURE 3-1
BRAWLEY HISTORICAL COMPARISON
FRM AND FEM PM₁₀ 24 HOUR AVG CONCENTRATIONS
JANUARY 1, 2010 TO MARCH 28, 2016

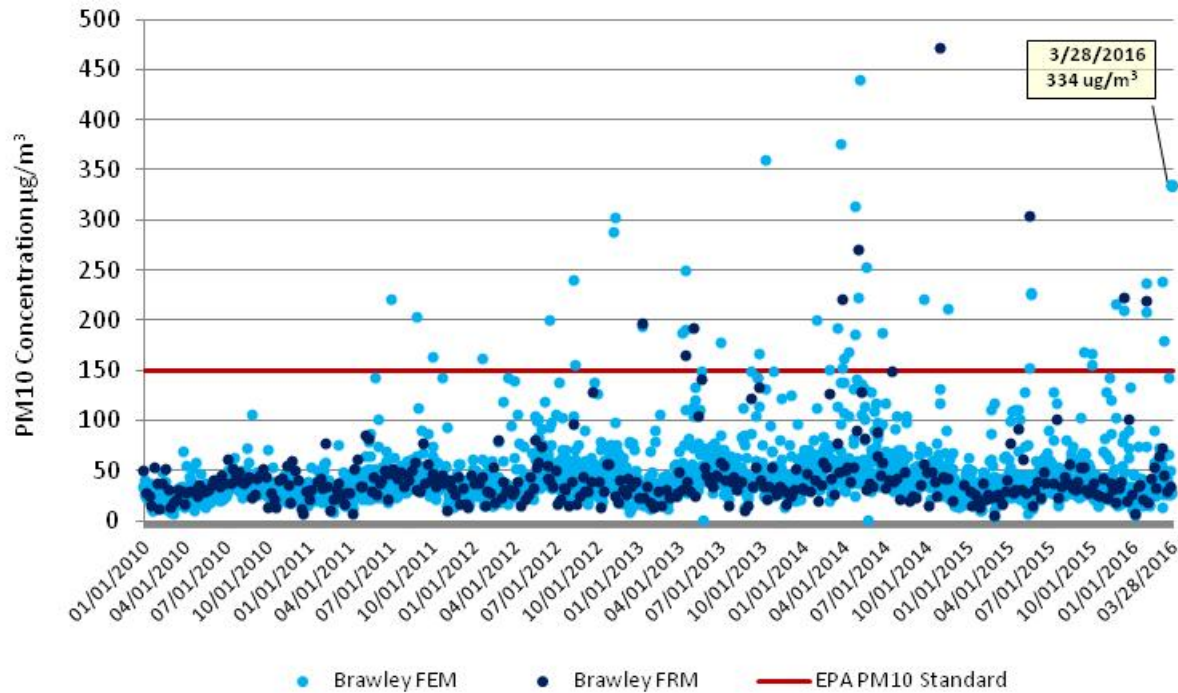


Fig 3-1: A comparison of PM₁₀ historical concentrations demonstrates that the measured concentration of 334 $\mu\text{g}/\text{m}^3$ by the Brawley monitor was outside the normal historical concentrations when compared to event days and non-event days

FIGURE 3-2
WESTMORLAND HISTORICAL COMPARISON
FRM AND FEM PM₁₀ 24 HOUR AVG CONCENTRATIONS
JANUARY 1, 2010 TO MARCH 28, 2016

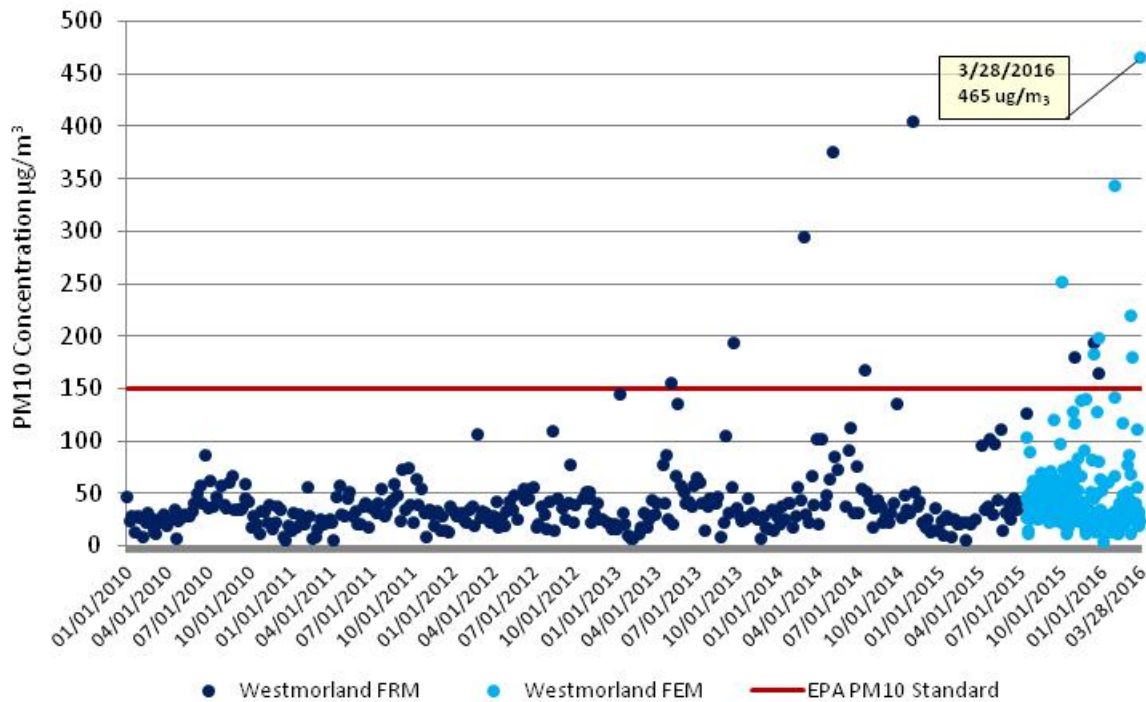


Fig 3-2: A comparison of PM₁₀ historical concentrations demonstrates that the measured concentration of 465 µg/m³ by the Westmorland monitor was outside the normal historical concentrations when compared to event days and non-event days

FIGURE 3-3
EL CENTRO HISTORICAL COMPARISON
FRM AND FEM PM₁₀ 24 HOUR AVG CONCENTRATIONS
JANUARY 1, 2010 TO MARCH 28, 2016

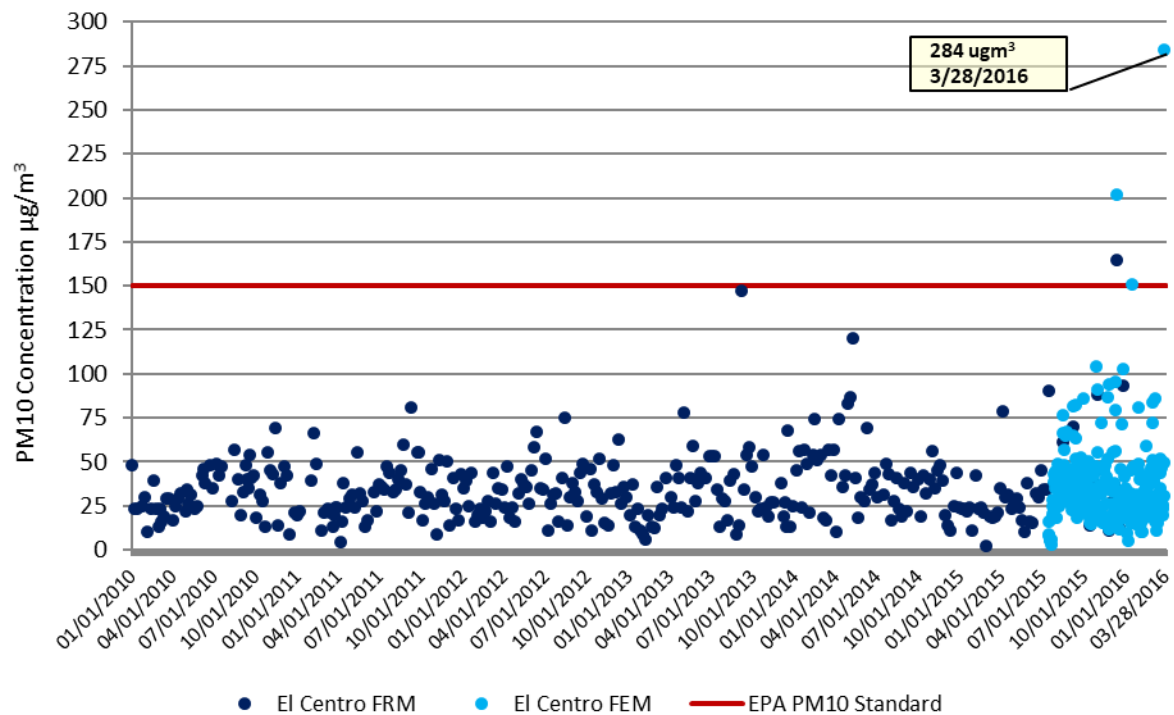


Fig 3-3: A comparison of PM₁₀ historical concentrations demonstrates that the measured concentration of 284 $\mu\text{g}/\text{m}^3$ by the El Centro monitor was outside the normal historical concentrations when compared to event days and non-event days

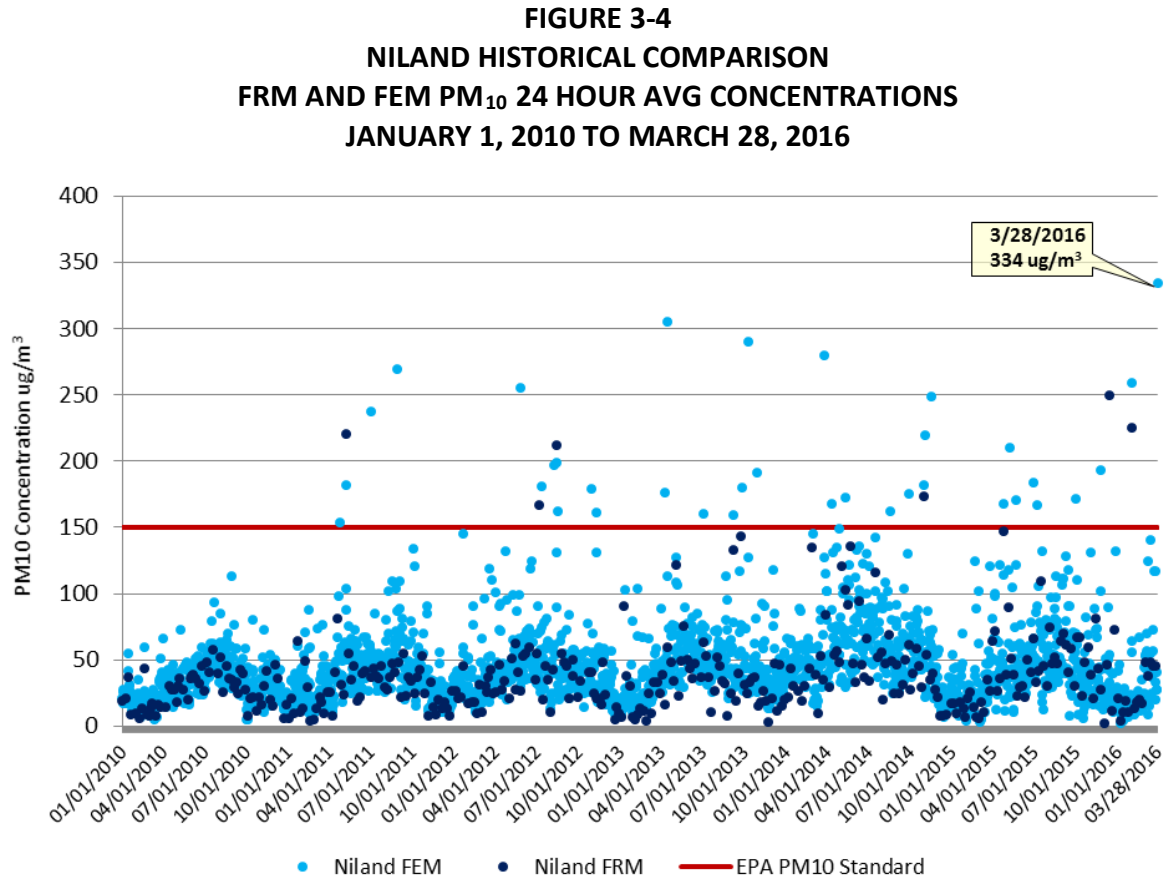


Fig 3-4: A comparison of PM₁₀ historical concentrations demonstrates that the measured concentration of 334 $\mu\text{g}/\text{m}^3$ by the Niland monitor was outside the normal historical concentrations when compared to event days and non-event days

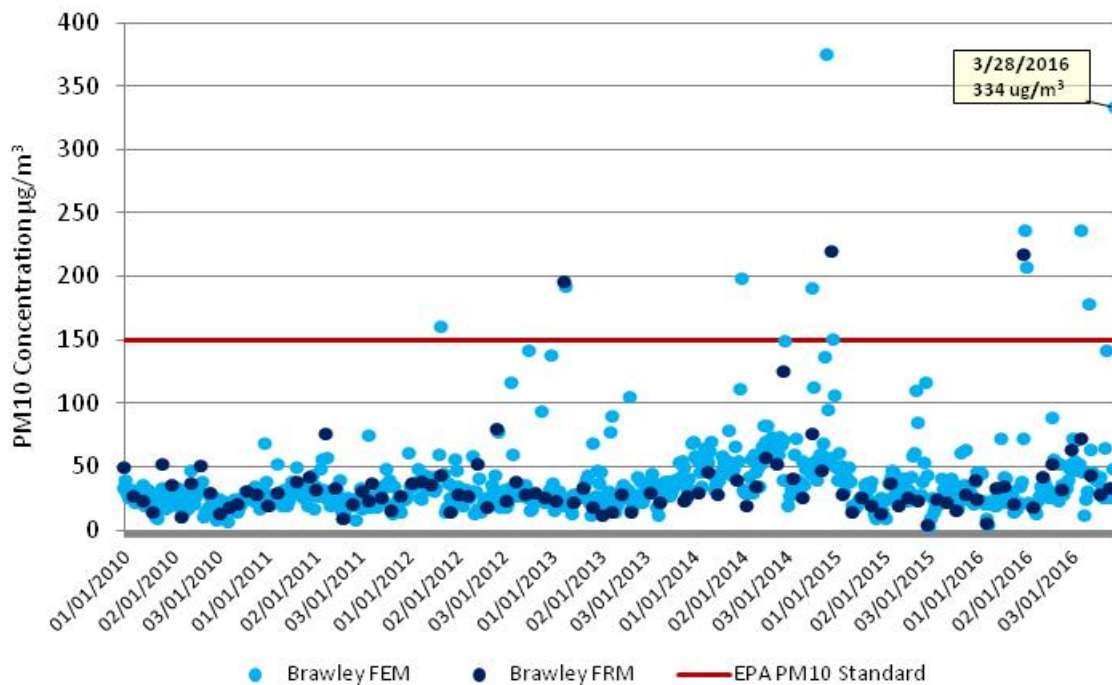
The time series, **Figures 3-1 through 3-4** for Brawley included 2,640 credible samples, for Westmorland 607 credible samples, for El Centro 613 credible samples and for Niland 2,638 credible samples measured between January 1, 2010 and March 28, 2016 or 2,279 sampling days for Brawley and Niland, 607 sampling days for Westmorland and 613n sampling days for El Centro.

Overall, the time series illustrates that the Brawley monitor, measured 43 exceedance days out of the 2,279 sampling days, which is less than a 2.0% occurrence rate. Westmorland measured 14 exceedance days out of 607 sampling days, which is less than a 2.5% occurrence rate. El Centro measured 2 exceedance days out of 613 sampling days, which is less than a 0.5% occurrence rate. Niland measured 39 exceedance days out of 2,279 sampling days, which is less than a 2.0% occurrence rate.

Of the total combined 67 exceedance days, 12 exceedance days occurred during the first quarter (January – March). The remaining 55 exceedance days occurred during the second, third and fourth quarters. The March 28, 2016 concentration is outside the normal historical

measurements for the first quarter. No exceedances of the standard occurred during 2010. As mentioned above, FEM BAM data was not regulatory from 2010 to 2012.

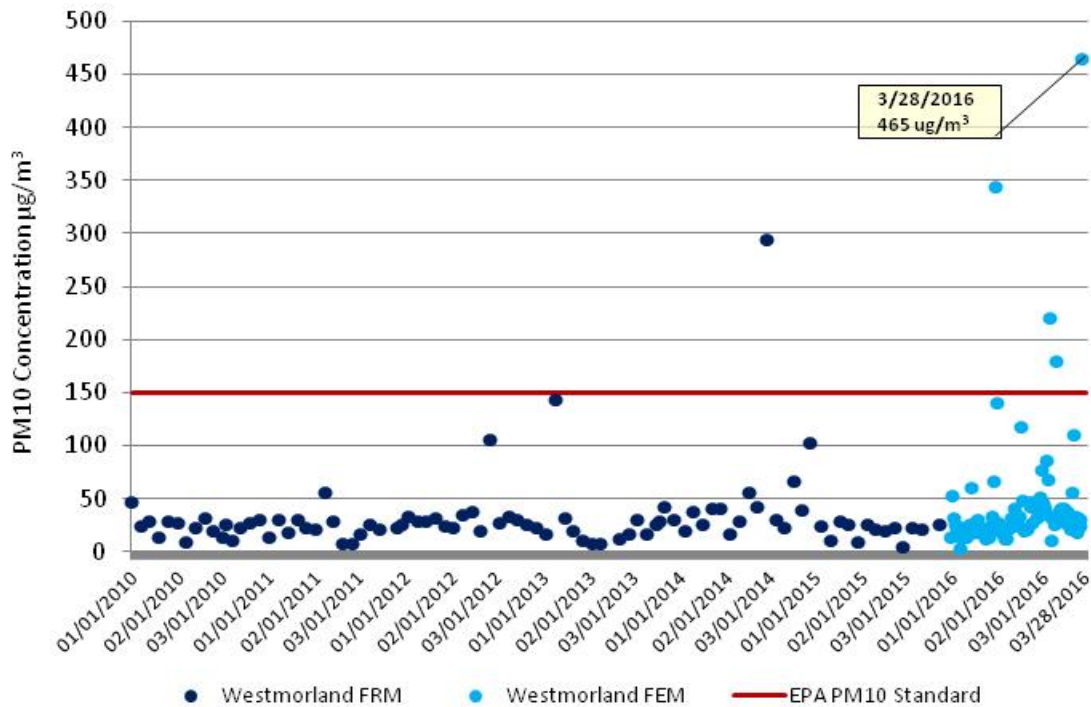
FIGURE 3-5
BRAWLEY SEASONAL COMPARISON
FRM AND FEM PM₁₀ 24 HOUR AVG CONCENTRATIONS
***JANUARY 1, 2010 TO MARCH 30, 2016**



*Quarterly: January 1, 2010 to March 31, 2015 and March 1, 2016 to March 28, 2016

Fig 3-5: A comparison of PM₁₀ seasonal concentrations demonstrates that the measured concentration of 334 µg/m³ by the Brawley monitor on March 28, 2016 was outside the normal seasonal concentrations when compared to event days and non-event days

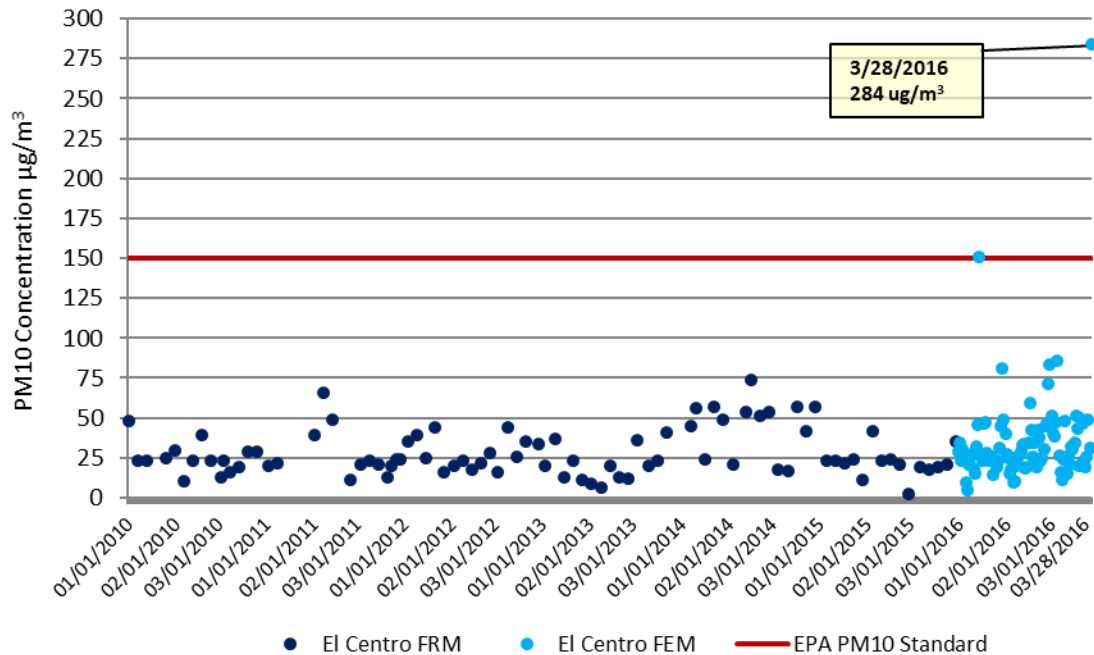
FIGURE 3-6
WESTMORLAND SEASONAL COMPARISON
FRM AND FEM PM₁₀ 24 HOUR AVG CONCENTRATIONS
***JANUARY 1, 2010 TO MARCH 30, 2016**



*Quarterly: January 1, 2010 to March 31, 2015 and March 1, 2016 to March 28, 2016

Fig 3-6: A comparison of PM₁₀ seasonal concentrations demonstrates that the measured concentration of 465 µg/m³ by the Westmorland monitor on March 28, 2016 was outside the normal seasonal concentrations when compared to event days and non-event days. Continuous sampling with a BAM 1020 monitor began July 15, 2015

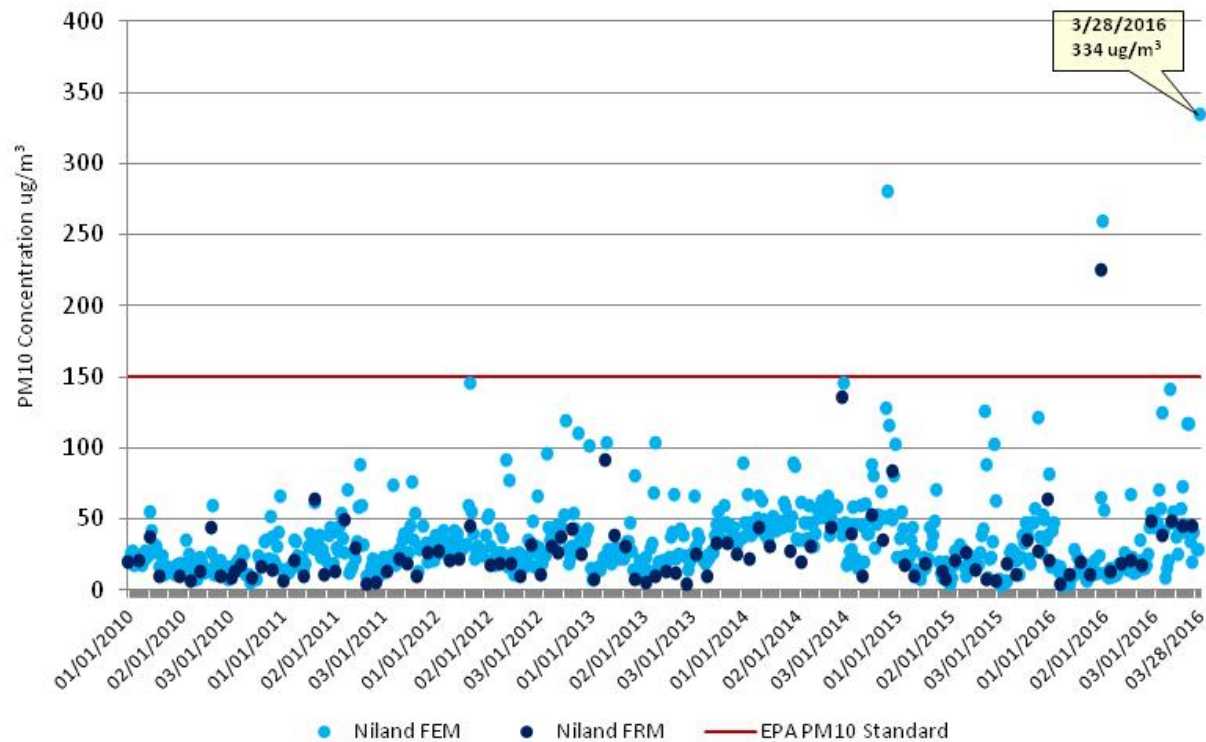
FIGURE 3-7
EL CENTRO SEASONAL COMPARISON
FRM AND FEM PM₁₀ 24 HOUR AVG CONCENTRATIONS
***JANUARY 1, 2010 TO MARCH 30, 2016**



*Quarterly: January 1, 2010 to March 31, 2015 and March 1, 2016 to March 28, 2016

Fig 3-7: A comparison of PM₁₀ seasonal concentrations demonstrates that the measured concentration of 284 µg/m³ by the El Centro monitor on March 28, 2016 was outside the normal seasonal concentrations when compared to event days and non-event days. Continuous sampling with a BAM 1020 monitor began July 15, 2015

FIGURE 3-8
NILAND SEASONAL COMPARISON
FRM AND FEM PM₁₀ 24 HOUR AVG CONCENTRATIONS
***JANUARY 1, 2010 TO MARCH 30, 2016**



*Quarterly: January 1, 2010 to March 31, 2015 and March 1, 2016 to March 28, 2016

Fig 3-8: A comparison of PM₁₀ seasonal concentrations demonstrates that the measured concentration of 334 $\mu\text{g}/\text{m}^3$ by the Niland monitor on March 28, 2016 was outside the normal seasonal concentrations when compared to event days and non-event days

Figures 3-5 through 3-8 displays the seasonal fluctuation over a combined quarterly review of 629 sampling days at the Brawley and Niland monitors, 181 sampling days for Westmorland and 184 sampling days for El Centro for first quarter (January - March) between 2010 and 2016. The Brawley monitor measured 731 credible samples, the Niland monitor measured 729 credible samples over 629 sampling days. The Westmorland monitor measured 177 credible samples over 181 sampling days and the El Centro monitor measured 175 credible samples over 184 sampling days. Of the 629 sampling days, there were 12 measured exceedance days, which equates to less than a 2.0% occurrence rate. The March 28, 2016 measured concentrations at the Brawley, El Centro, Niland and Westmorland monitors were outside the normal historical and seasonal concentrations when compared to both event days and non-event days.

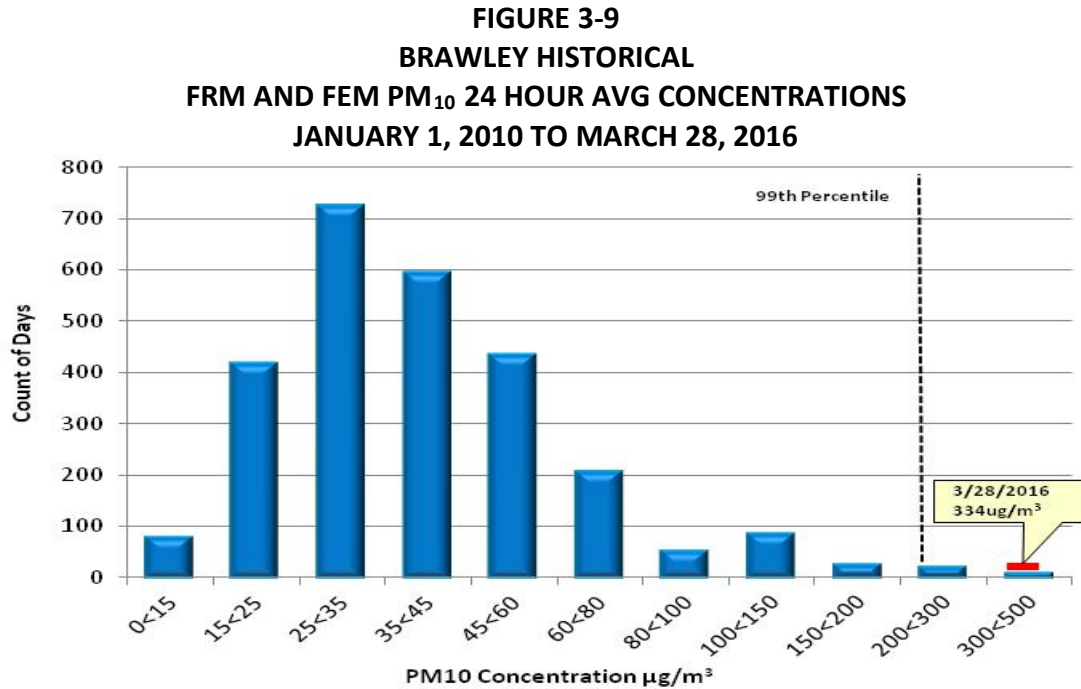


Fig 3-9: The 24-hr average PM₁₀ concentration at the Brawley monitoring site demonstrates that the concentration of 334 $\mu\text{g}/\text{m}^3$ falls above the 99th percentile

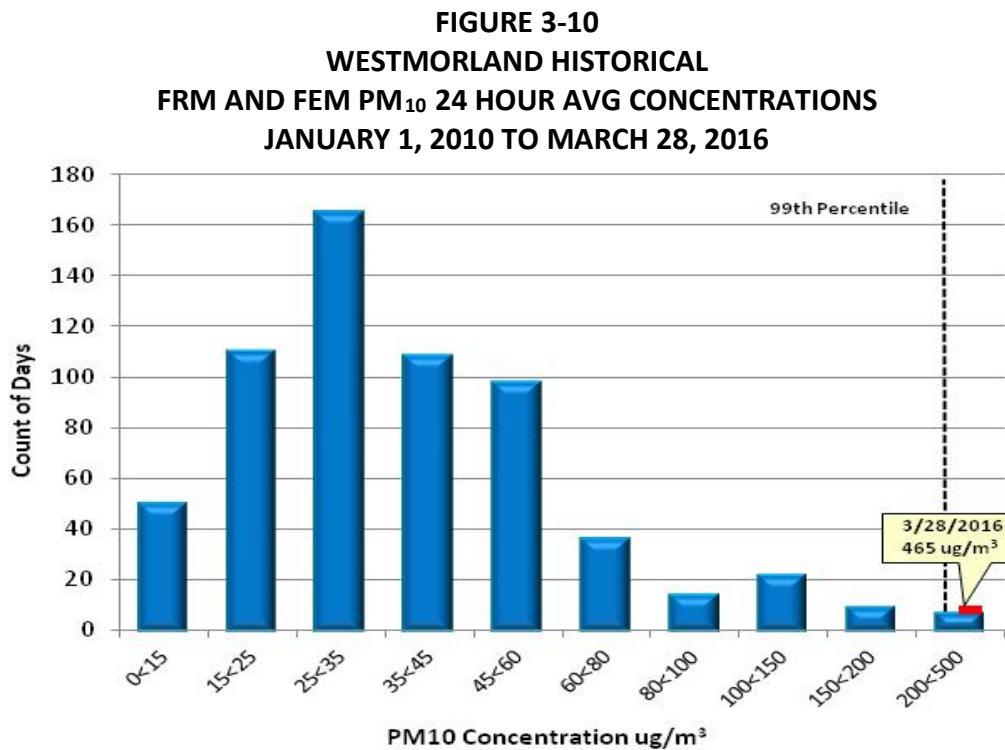


Fig 3-10: The 24-hr average PM₁₀ concentration at the Westmorland monitoring site demonstrates that the concentration of 465 $\mu\text{g}/\text{m}^3$ was in excess of the 99th percentile

FIGURE 3-11
EL CENTRO HISTORICAL
FRM AND FEM PM₁₀ 24 HOUR AVG CONCENTRATIONS
JANUARY 1, 2010 TO MARCH 28, 2016

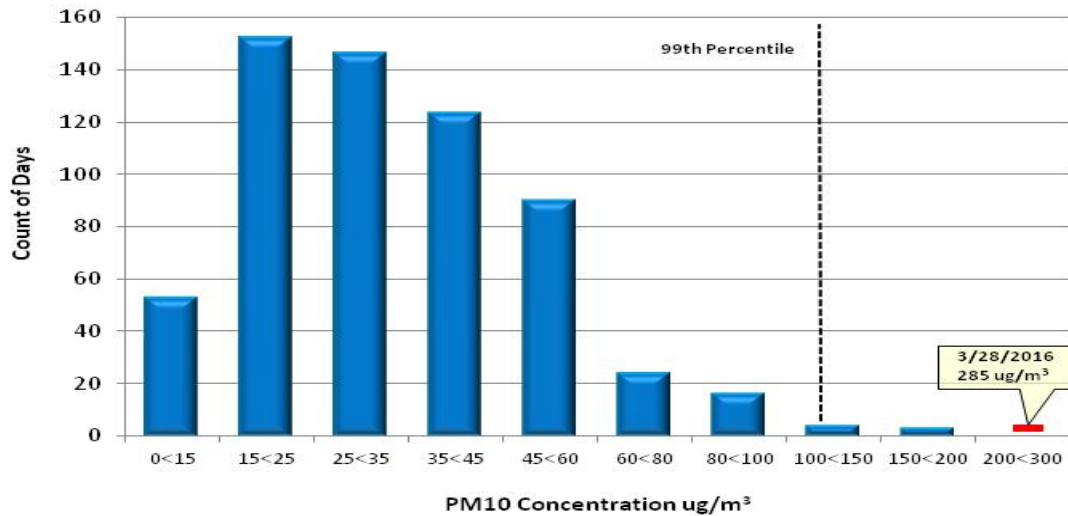


Fig 3-11: The 24-hr average PM₁₀ concentration at the El Centro monitoring site demonstrates that the concentration of 284 µg/m³ was in excess of the 99th percentile

FIGURE 3-12
NILAND HISTORICAL
FRM AND FEM PM₁₀ 24 HOUR AVG CONCENTRATIONS
JANUARY 1, 2010 TO MARCH 28, 2016

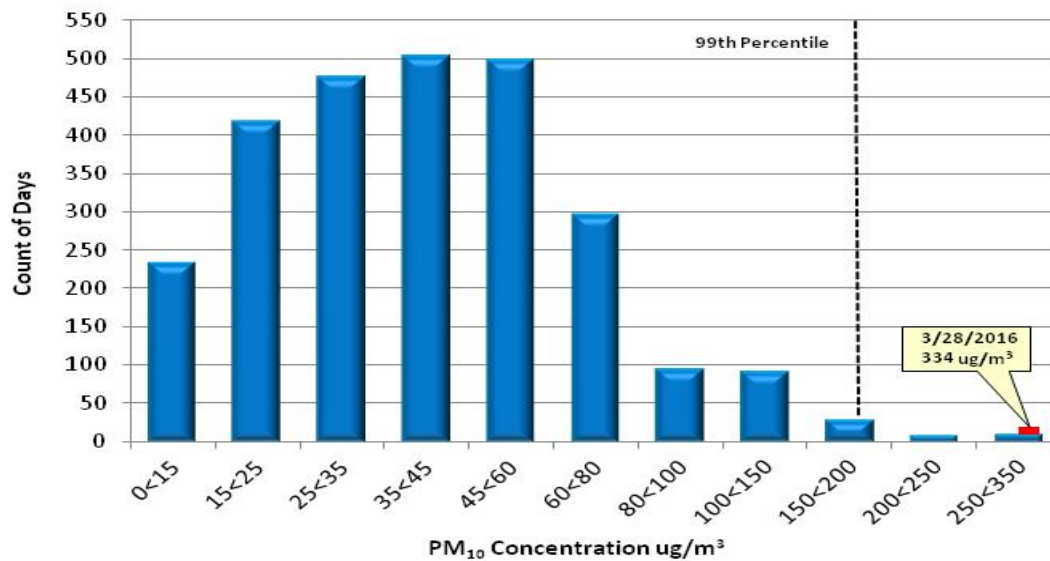


Fig 3-12: The 24-hr average PM₁₀ concentration at the Niland monitoring site demonstrates that the concentration of 334 µg/m³ was in excess of the 99th percentile

For the combined FRM and FEM data sets for the Brawley, El Centro, Niland and Westmorland monitors the annual historical and the seasonal historical PM₁₀ concentration of 334 µg/m³, 284 µg/m³, 334 µg/m³ and 465 µg/m³, respectively, are above the 99th percentile rank. Looking at the annual time series concentrations, the seasonal time series concentrations and the percentile rankings for both the historical and seasonal patterns the March 28, 2016 measured exceedance is clearly outside the normal concentration levels when comparing to non-event days and event days.

III.2 Summary

The information provided, above, by the time series plots, seasonal time series plots, and the percentile rankings illustrate that the PM₁₀ concentration observed on March 28, 2016 occurs infrequently. When comparing the measured PM₁₀ levels on March 28, 2016 and following USEPA EER guidance, this demonstration provides supporting evidence that the measured exceedances measured at the Brawley, El Centro, Niland, and Westmorland monitors were outside the normal historical and seasonal historical concentration levels.

The historical concentration analysis provided here supports the determination that the March 28, 2016 natural event affected the concentration levels at the Brawley, El Centro, Niland, and Westmorland monitors causing an exceedance. The concentration analysis further supports that the natural event affected air quality in such a way that there exists a clear causal relationship between the measured exceedances on March 28, 2016 and the natural event, qualifying the natural event as an Exceptional Event.

IV Not Reasonably Controllable or Preventable

According to the October 3, 2016 promulgated revision to the Exceptional Event (EE) rule under 40 CFR §50.14(b)(8) air agencies must address the “not reasonably controllable or preventable” (nRCP) criterion as two prongs. To address the nRCP criterion the ICAPCD must not only identify the natural and anthropogenic sources of emissions causing and contributing to the monitored exceedance but must identify the relevant State Implementation Plan (SIP) measures and/or other enforceable control measures in place for the identified sources. An effective analysis of the nRCP must include the implementation status of the control measures to consider the measures as enforceable. USEPA considers control measures enforceable if approved into the SIP within 5 years of an EE demonstration submittal. The identified control measures must address those specific sources that as causing or contributing to a monitored exceedance.

The final EE rule revision explains that an event is not reasonably controllable if reasonable measures to control the impact of the event on air quality were applied at the time of the event. Similarly, an event is not reasonably preventable if reasonable measures to prevent the event were applied at the time of the event. However, for “high wind events” when PM₁₀ concentrations are due to dust raised by high winds from desert areas whose sources are controlled with Best Available Control Measures (BACM) then the event is a “natural event” where human activity plays little or no direct causal role and thus is considered not preventable.

This section begins by providing background information on all SIP and other enforceable control measures in force during the EE for March 28, 2016. In addition, this March 28, 2016 demonstration provides technical and non-technical evidence that strong and gusty westerly winds blew across the mountains and deserts within southeastern California and into Imperial County suspending particulate matter affecting the Brawley and Westmorland monitors on March 28, 2016. This section identifies all natural and anthropogenic sources and provides regulatory evidence of the enforceability of the control measures in place during the March 28, 2016 EE.

IV.1 Background

Inhalable particulate matter (PM₁₀) contributes to effects that are harmful to human health and the environment, including premature mortality, aggravation of respiratory and cardiovascular disease, decreased lung function, visibility impairment, and damage to vegetation and ecosystems. Upon enactment of the 1990 Clean Air Act (CAA) amendments, Imperial County was classified as moderate nonattainment for the PM₁₀ NAAQS under CAA sections 107(d)(4)(B) and 188(a). By November 15, 1991, such areas were required to develop and submit State Implementation Plan (SIP) revisions providing for, among other things, implementation of reasonably available control measures (RACM).

Partly to address the RACM requirement, ICAPCD adopted local Regulation VIII rules to control PM₁₀ from sources of fugitive dust on October 10, 1994, and revised them on November 25,

1996. USEPA did not act on these versions of the rules with respect to the federally enforceable SIP.

On August 11, 2004, USEPA reclassified Imperial County as a serious nonattainment area for PM₁₀. As a result, CAA section 189(b)(1)(B) required all BACM to be implemented in the area within four years of the effective date of the reclassification, i.e., by September 10, 2008.

On November 8, 2005, partly to address the BACM requirement, ICAPCD revised the Regulation VIII rules to strengthen fugitive dust requirements. On July 8, 2010, USEPA finalized a limited approval of the 2005 version of Regulation VIII, finding that the seven Regulation VIII rules largely fulfilled the relevant CAA requirements. Simultaneously, USEPA also finalized a limited disapproval of several of the rules, identifying specific deficiencies that needed to be addressed to fully demonstrate compliance with CAA requirements regarding BACM and enforceability.

In September 2010, ICAPCD and the California Department of Parks and Recreation (DPR) filed petitions with the Ninth Circuit Federal Court of Appeals for review of USEPA's limited disapproval of the rules. After hearing oral argument on February 15, 2012, the Ninth Circuit directed the parties to consider mediation before rendering a decision on the litigation. On July 27, 2012, ICAPCD, DPR and USEPA reached agreement on a resolution to the dispute which included a set of specific revisions to Regulation VIII. These revisions are reflected in the version of Regulation VIII adopted by ICAPCD on October 16, 2012 and approved by USEPA April 22, 2013. Since 2006 ICAPCD had implemented regulatory measures to control emissions from fugitive dust sources and open burning in Imperial County.

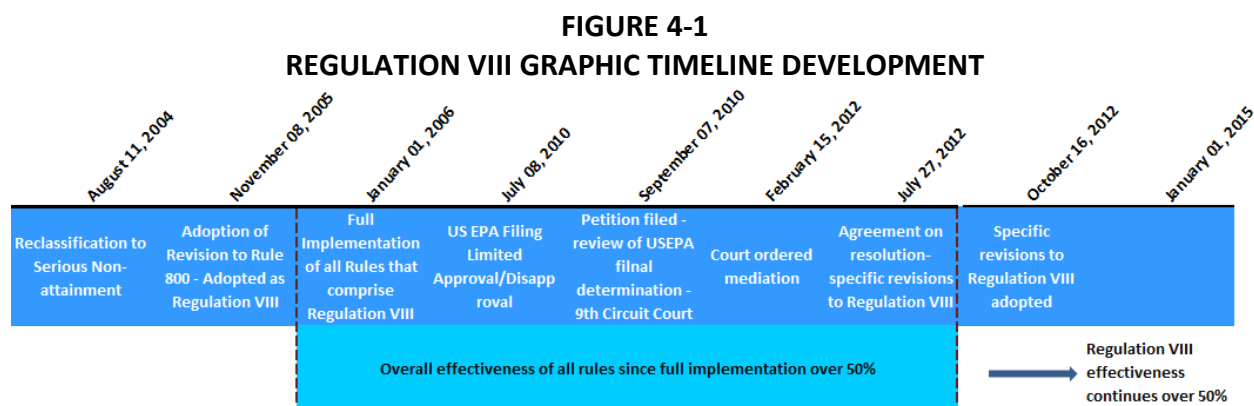


Fig 4-1: Regulation VIII Graphic Timeline

IV.1.a Control Measures

A brief summary of Regulation VIII which is comprised of seven fugitive dust rules is found below. The complete set of rules can be found in **Appendix D**.

ICAPCD's Regulation VIII consists of seven interrelated rules designed to limit emissions of PM₁₀ from anthropogenic fugitive dust sources in Imperial County.

Rule 800, General Requirements for Control of Fine Particulate Matter, provides definitions, a compliance schedule, exemptions and other requirements generally applicable to all seven rules. It requires the United States Bureau of Land Management (BLM), United States Border Patrol (BP) and DPR to submit dust control plans (DCP) to mitigate fugitive dust from areas and/or activities under their control. Appendices A and B within Rule 800 describe methods for determining compliance with opacity and surface stabilization requirements in Rules 801 through 806.

Rule 801, Construction and Earthmoving Activities, establishes a 20% opacity limit and control requirements for construction and earthmoving activities. Affected sources must submit a DCP and comply with other portions of Regulation VIII regarding bulk materials, carry-out and track-out, and paved and unpaved roads. The rule exempts single family homes and waives the 20% opacity limit in winds over 25 mph under certain conditions.

Rule 802, Bulk Materials, establishes a 20% opacity limit and other requirements to control dust from bulk material handling, storage, transport and hauling.

Rule 803, Carry-Out and Track-Out, establishes requirements to prevent and clean-up mud and dirt transported onto paved roads from unpaved roads and areas.

Rule 804, Open Areas, establishes a 20% opacity limit and requires land owners to prevent vehicular trespass and stabilize disturbed soil on open areas larger than 0.5 acres in urban areas, and larger than three acres in rural areas. Agricultural operations are exempted.

Rule 805, Paved and Unpaved Roads, establishes a 20% opacity limit and control requirements for unpaved haul and access roads, canal roads and traffic areas that meet certain size or traffic thresholds. It also prohibits construction of new unpaved roads in certain circumstances. Single-family residences and agricultural operations are exempted.

Rule 806, Conservation Management Practices, requires agricultural operation sites greater than 40 acres to implement at least one conservation management practice (CMP) for each of several activities that often generates dust at agricultural operations. In addition, agricultural operation sites must prepare a CMP plan describing how they comply with Rule 806, and must make the CMP plan available to the ICAPCD upon request.

IV.1.b Additional Measures

Imperial County Natural Events Action Plan (NEAP)

On August 2005, the ICAPCD adopted a NEAP for the Imperial County, as was required under the former USEPA Natural Events Policy, to address PM₁₀ events by:

- Protecting public health;
- Educating the public about high wind events;
- Mitigating health impacts on the community during future events; and

- Identifying and implementing BACM measures for anthropogenic sources of windblown dust.

Smoke Management Plan (SMP) Summary

There are 35 Air Pollution Control Districts or Air Quality Management Districts in California which are required to implement a district-wide smoke management program. The regulatory basis for California's Smoke Management Program, codified under Title 17 of the California Code of Regulations is the "Smoke Management Guidelines for Agricultural and Prescribed Burning" (Guidelines). California's 1987 Guidelines were revised to improve interagency coordination, avoid smoke episodes, and provide continued public safety while providing adequate opportunity for necessary open burning. The revisions to the 1987 Guidelines were approved March 14, 2001. All air districts, with the exception of the San Joaquin Valley Air Pollution Control District (SJAPCD) were required to update their existing rules and Smoke Management Plans to conform to the most recent update to the Guidelines.

Section 80150 of Title 17 specifies the special requirements for open burning in agricultural operations, the growing of crops and the raising of fowl or animals. This section specifically requires the ICAPCD to have rules and regulations that require permits that contain requirements that minimize smoke impacts from agricultural burning.

On a daily basis, the ICAPCD reviews surface meteorological reports from various airport agencies, the NWS, State fire agencies and CARB to help determine whether the day is a burn day. Using a four quadrant map of Imperial County allowed burns are allocated in such a manner as to assure minimal to no smoke impacts safeguarding the public health. Finally, all permit holders are required to notice and advise members of the public of a potential burn. This noticing requirement is known as the Good Neighbor Policy. On March 28, 2016 the ICAPCD declared a No Burn day (**Appendix A**). No complaints were filed for agricultural burning on March 28, 2016.

IV.1.c Review of Source Permitted Inspections and Public Complaints

A query of the ICAPCD permit database was compiled and reviewed for active permitted sources throughout Imperial County and specifically around Westmorland, El Centro, Niland, and Brawley during the March 28, 2016 PM₁₀ exceedance. Both permitted and non-permitted sources are required to comply with Regulation VIII requirements that address fugitive dust emissions. The identified permitted sources are Aggregate Products, Inc., US Gypsum Quarry, Imperial Aggregates (Val-Rock, Inc., and Granite Construction), US Gypsum Plaster City, Clean Harbors (Laidlaw Environmental Services), Bullfrog Farms (Dairy), Burrtec Waste Industries, Border Patrol Inspection station, Centinela State Prison, various communications towers not listed and various agricultural operations. Non-permitted sources include the wind farm known as Ocotillo Express, and a solar facility known as CSolar IV West. Finally, the desert regions are under the jurisdiction of the Bureau of Land Management and the California Department of Parks (Including Anza Borrego State Park and Ocotillo Wells).

An evaluation of all inspection reports, air quality complaints, compliance reports, and other documentation indicate no evidence of unusual anthropogenic-based PM₁₀ emissions. March 28, 2016 was officially designated as a No Burn day. One complaint was filed on March 28, 2016 related to dust. ICAPCD reported a complaint of excessive dust emissions coming from an agricultural field west of a section of property located at 1737 Lotus Lane in El Centro. The ICAPCD received an afterhours complaint on March 28, 2016 at 830pm. At 820am the following day, March 29, 2016 certified ICAPCD staff investigated and found no dust.

FIGURE 4-2
PERMITTED SOURCES

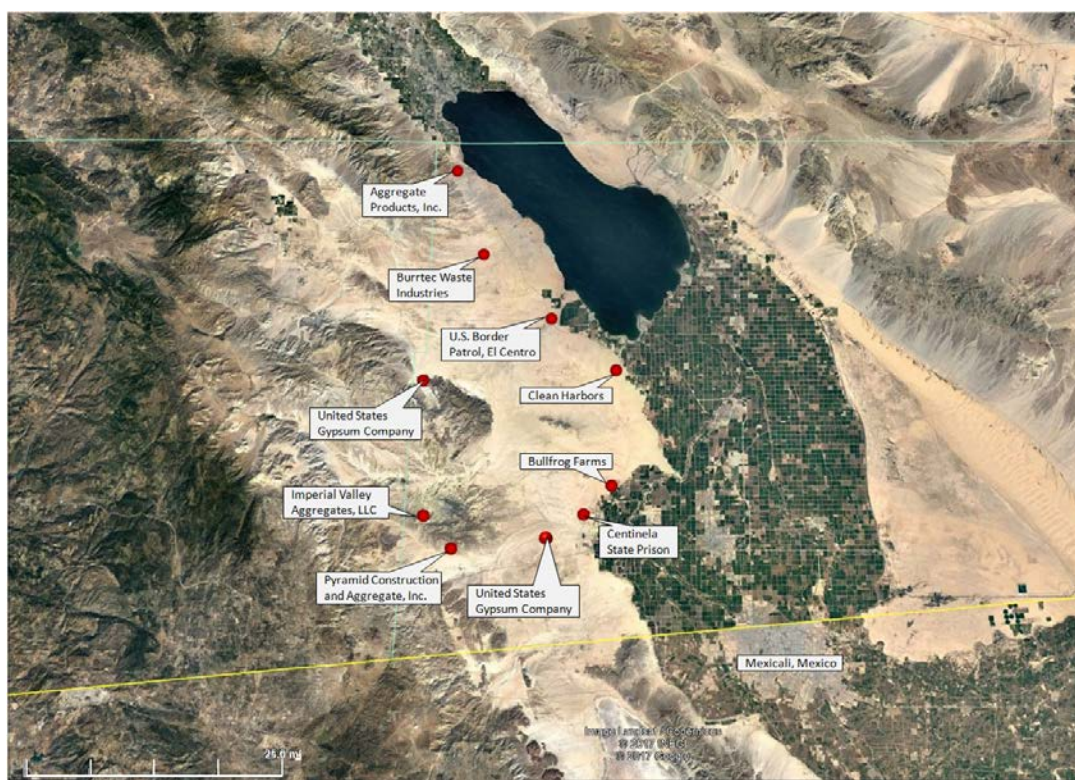


Fig 4-2: The above map identifies those permitted sources located west, northwest and southwest of the Brawley, El Centro, Niland and Westmorland monitors. The green line to the north denotes the political division between Imperial and Riverside counties. The yellow line below denotes the international border between the United States and Mexico. The green checker-boarded areas are a mixed use of agricultural and community parcels. In addition, the desert areas are managed either by the Bureau of Land Management or the California Department of Parks. Base map from Google Earth

FIGURE 4-3
NON-PERMITTED SOURCES

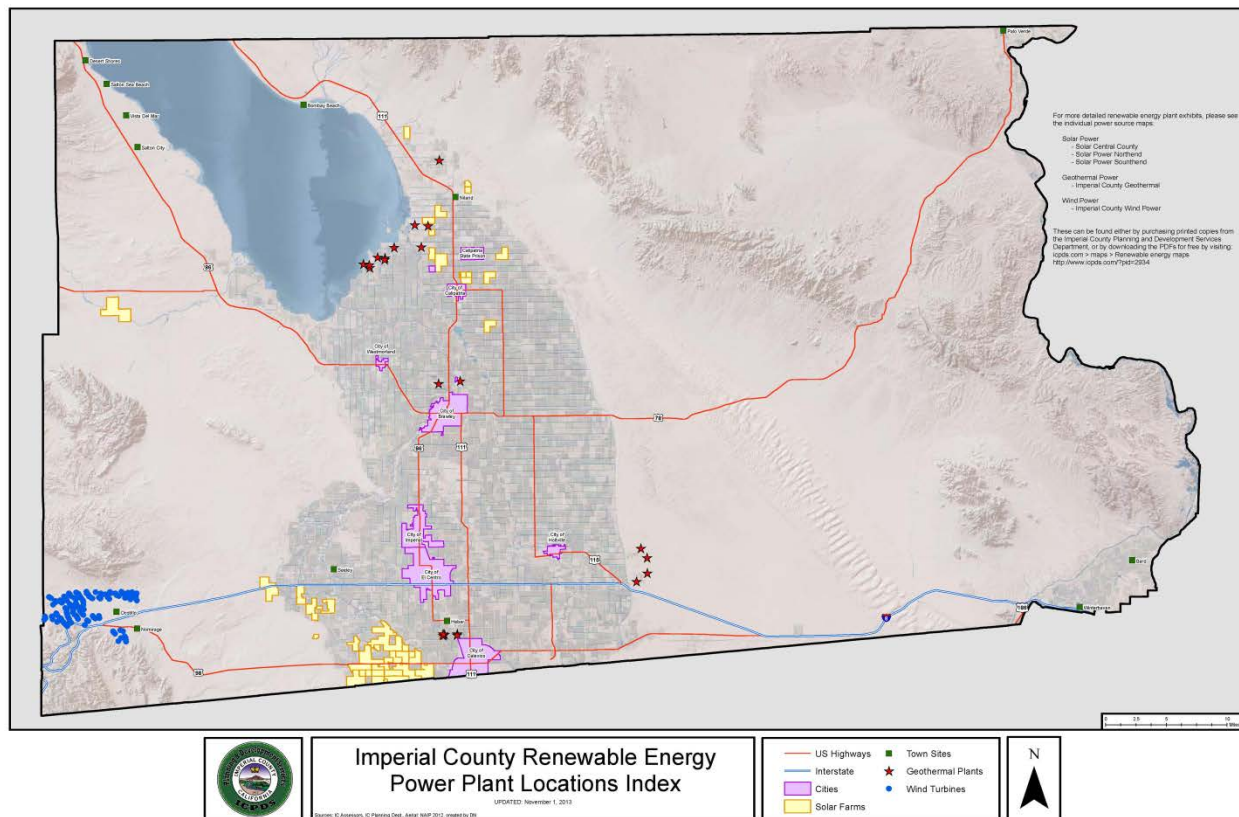


Fig 4-3: The above map identifies those power sources located west, northwest and southwest of the Brawley, El Centro, Niland and Westmorland monitors. Blue indicate the Wind Turbines, Yellow are the solar farms and stars are geothermal plants

IV.2 Forecasts and Warnings

The NWS Phoenix office issued a Wind Advisory on March 26, 2016 and a Blowing Dust Advisory for on March 28, 2016 for Imperial County. Winds of 30 mph were forecasted with frequent gusts to 45 mph. Visibility was expected to fall below one mile along the Interstate 8 corridor due to blowing dust and sand. The San Diego office issued a High Wind Watch on March 26, 2016 for a broad area that included the mountains and deserts of San Diego County. West winds of up to 35 mph with gusts 55 to 60 mph with even stronger winds of 40 to 50 mph and gusts of 70 to 80 mph were forecasted for the desert slopes. The watch transitioned to a Wind Warning¹³ by 951pm on March 27, 2016 which included March 28, 2016. This area was an important upstream source during the wind event.

¹³ A High Wind Warning is issued when the following conditions are expected: 1) sustained winds of 40 mph or higher for one hour or more OR 2) wind gusts of 58 mph or higher for any duration; <http://www.weather.gov/lwx/WarningsDefined>

The ICAPCD posted on its website a Weather Story forecast from the NWS Phoenix office regarding the high winds and blowing dust and sand that were expected on March 28, 2016. The notice also carried an advisory that high winds had the potential to suspend particulate matter into the air, and possibly pose an impact to public health.

IV.3 Wind Observations

Wind data during the event were collected from airports in eastern Riverside County, southeastern San Diego County, southwestern Yuma County (Arizona), northern Mexico, and Imperial County. Data were also collected from automated meteorological instruments that were upstream from the Brawley, El Centro, Niland, and Westmorland station monitors during the wind event. El Centro NAF (KNJK) had multiple and consecutive hours of winds at or above the 25 mph wind threshold. KNJK had 15 hours of winds at or above the 25 mph threshold, with 12 hours consecutive. The airfield experienced 18 hours of gusts at or above 31 mph, with seven hours of gusts at or above 40 mph, and three hours of gusts above 50 mph. Blowing dust was observed at the airfield over nine hours. Heavy dust storms were observed six times over two hours. Peak winds at the airfield were 43 mph while peak gusts reached 52 mph. KIPL reported 17 hours of winds at or above the 25 mph threshold, with 13 hours consecutive. Gusts were at or above 33 mph for 19 hours and for 12 hours gusts were at or above 40 mph. Peak winds reached 39 mph while gusts topped out at 51 mph.

Wind speeds of 25 mph are normally sufficient to overcome most PM₁₀ control measures. During the March 28, 2016 event wind speeds were above the 25-mph threshold, overcoming the BACM in place.

IV.4 Summary

The weather and air quality forecasts and warnings outlined in this section demonstrate that high winds accompanying a strong cold front that moved through southern California lofted dust that caused uncontrollable PM₁₀ emissions. The BACM list as part of the control measures in Imperial County for fugitive dust emissions were in place at the time of the event. These control measures are required for areas designated as "serious" non-attainment for PM₁₀, such as Imperial County. Thus, the BACM in place at the time of the event were beyond reasonable. In addition, surface wind measurements at or upstream of Brawley, El Centro, Niland, and Westmorland monitoring stations during the event were high enough (at or above 25 mph, with wind gusts over 50 mph) that BACM PM₁₀ control measures would have been overwhelmed.

Finally, a high wind dust event can be considered as a natural event, even when portions of the wind-driven emissions are anthropogenic, as long as those emissions have a clear causal relationship to the event and were determined to be not reasonably controllable or preventable. This demonstration has shown that the event that occurred on March 28, 2016 was not reasonably controllable or preventable despite the strong and in force BACM within the affected areas in Imperial County. This demonstration has similarly established a clear causal relationship between the exceedances and the high wind event timeline and geographic location. The March

March 28, 2016 Exceptional Event, Imperial County Not Reasonably Controllable or Preventable

28, 2016 event can be considered an exceptional event under the requirements of the exceptional event rule.

V Clear Causal Relationship

V.1 Discussion

Meteorological observations for March 28, 2016 identified gusty high westerly winds when the strengthening of a surface low over southern Nevada resulted in the packing of the surface pressure gradient on the March 28, 2016. Surface pressure falls strengthened the gradient from the California coast to southern Nevada. The resulting onshore flow brought dangerously high winds across the mountains and deserts of southeastern California. Winds up to 43 and gusts up to 52 mph created blowing dust in Imperial County. As a result of the windblown dust air monitors located in Brawley, El Centro, Niland and Westmorland measured an exceedance of the NAAQS.

Figures 5-1 through 5-5 provide information regarding the extent and intensity of the gusty westerly winds that were measured throughout the region, including Riverside, Imperial Count and Arizona.

FIGURE 5-1
PRESSURE GRADIENT TIGHT OVER SOUTHERN CALIFORNIA

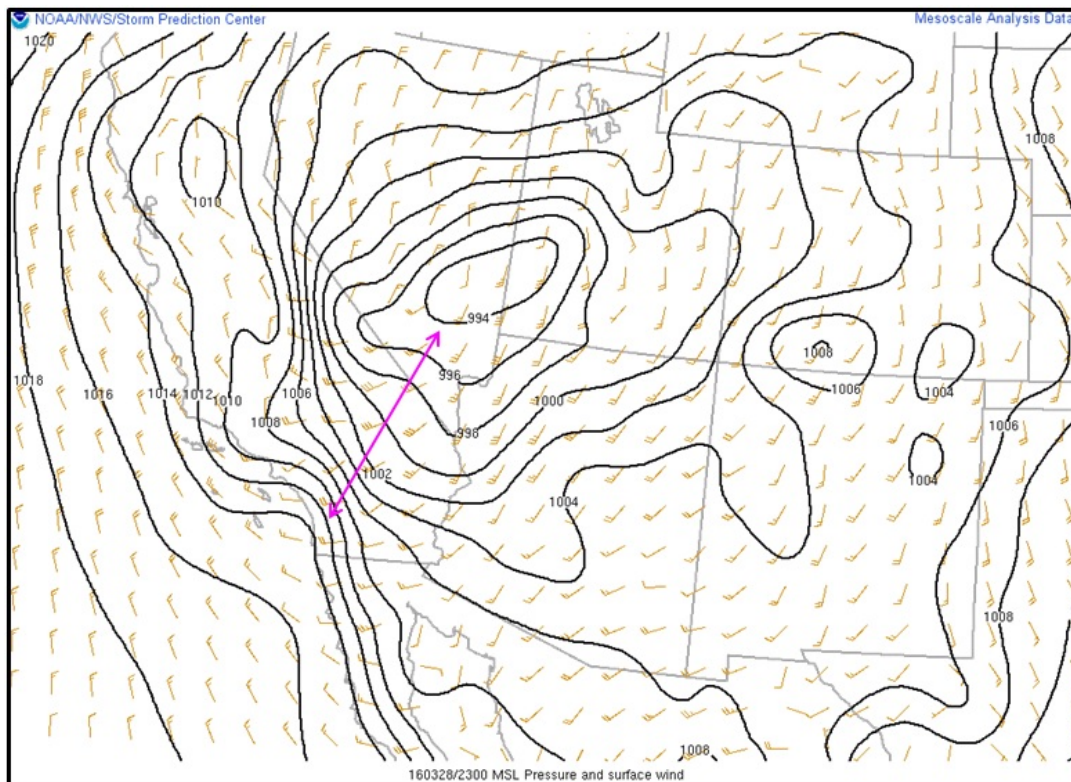


Fig 5-1: A surface pressure gradient map (1600 PST March 28, 2016) shows a 1012mb to 994mb fall from the southern California coast to the center of the low across southern Nevada. The steep gradient led to a strong onshore flow and high winds across the region, particularly Imperial County. Source: NOAA-NWS Storm Prediction Center; <http://www.spc.noaa.gov>

FIGURE 5-2
HIGH ACROSS SOUTHEASTERN CALIFORNIA RAISE DUST/SAND

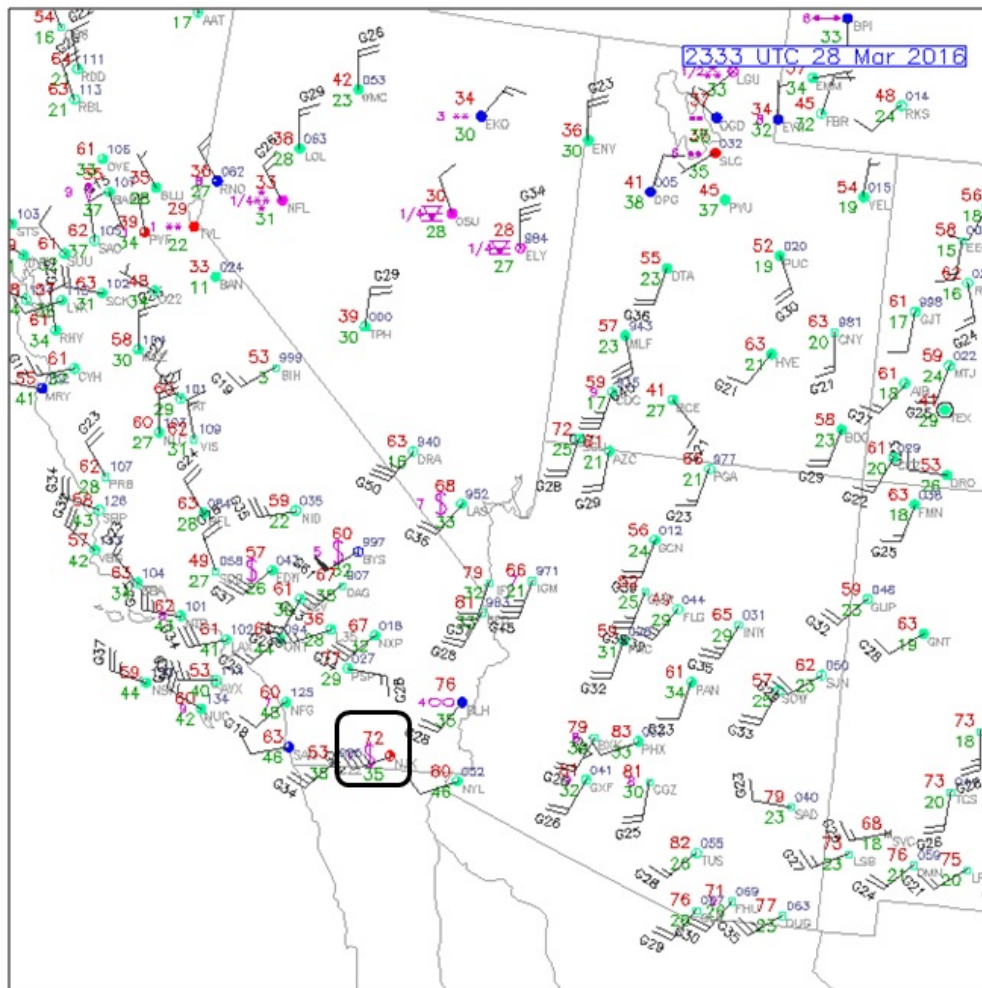


Fig 5-2: Winds began increasing in the early morning hours and intensified through the day. This surface wind map depicting high winds across southeast California at 1533 PST. At 1553 KIPL measured winds of 30 mph and gusts of 41 mph, while at 1526 KNJK measured winds of 38 mph and gusts of 45 mph. The airport coincidentally also reported blowing dust at 1526 PST and observations of heavy dust storms before and after this period. The maroon symbol in the surface map (see boxed area) indicates raised dust or sand. The wind barb in the boxed area indicates winds of at least 40.3 mph. Source: <http://weather.rap.ucar.edu/satellite>

FIGURE 5-3
HIGH WINDS RAISE DUST/SAND OVER WIDE REGION

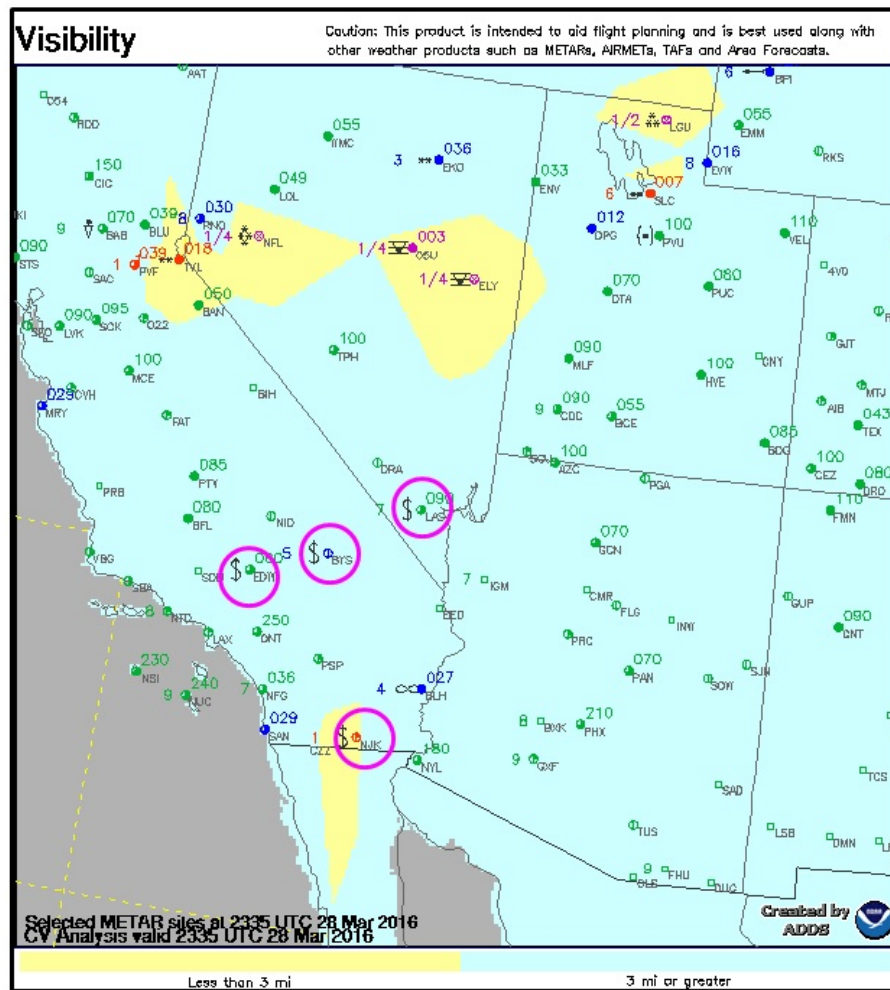


Fig 5-3: Entrained windblown dust by the high wind event on March 28, 2016 affected visibility over a wide region. Visibility was limited to less than three miles at El Centro NAF (in actuality visibility dropped to zero miles at 1458 PST). See bottom circle. Locations as far away as Las Vegas also had visibility affected by raised dust/sand. Source: <http://www.aviationweather.gov>

Figure 5-4 illustrates the Aerosol Optical Depth (AOD)¹⁴ over the area on March 28, 2016. The image, captured by the MODIS instrument onboard the Aqua satellite at approximately 1330 PST, helps support the affect upon the region by windblown dust. Warmer colors indicate thicker AOD,

¹⁴ Aerosol Optical Depth (AOD) (or Aerosol Optical Thickness) indicates the level at which particles in the air (aerosols) prevent light from traveling through the atmosphere. Aerosols scatter and absorb incoming sunlight, which reduces visibility. From an observer on the ground, an AOD of less than 0.1 is "clean" - characteristic of clear blue sky, bright sun and maximum visibility. As AOD increases to 0.5, 1.0, and greater than 3.0, aerosols become so dense that sun is obscured. Sources of aerosols include pollution from factories, smoke from fires, dust from dust storms, sea salt, and volcanic ash and smog. Aerosols compromise human health when inhaled by people, particularly those with asthma or other respiratory illnesses. Source: <https://worldview.earthdata.nasa.gov>

an indication of thicker particles in the air. Supporting the analysis of windblown dust in the region, NOAA's Smoke Text Product (effective through 1900 PST March 28, 2016) reported incidents of blowing dust from multiple locations in the southern third of California, southern Nevada, and western Arizona (**Appendix A**).

FIGURE 5-4
AEROSOL OPTICAL DEPTH

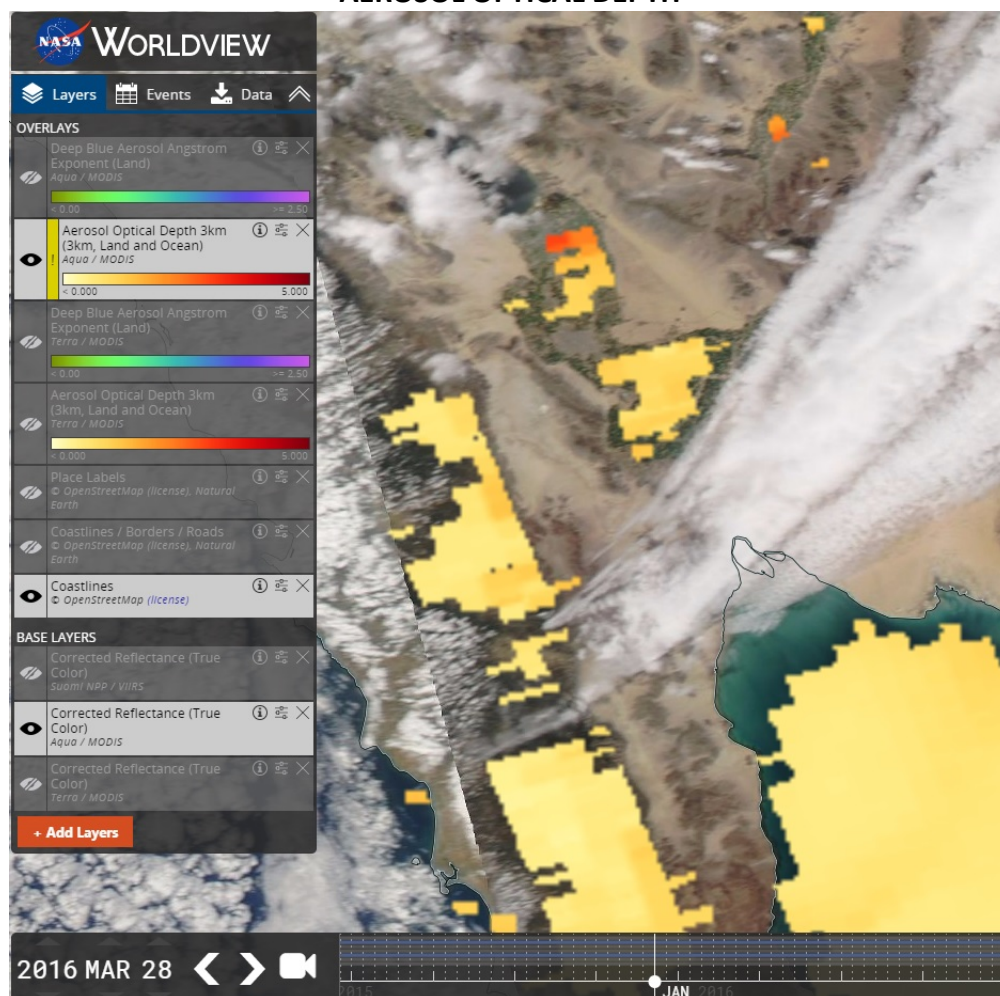


Fig 5-4: The MODIS instrument onboard the Aqua satellite captured a relatively thick patch of aerosols over Imperial County on March 28, 2016 at around 1330 PST. Unfortunately, the satellite made its pass before peak concentrations were measured at monitoring stations. Source: <https://worldview.earthdata.nasa.gov>

The EPA accepts a high wind threshold for sustained winds of 25 mph in California and 12 other states.¹⁵ **Tables 5-1 through 5-2** provide a temporal relationship of wind speeds, wind direction, wind gusts (if available), and PM₁₀ concentrations at the exceeding monitors.¹⁶ The Brawley

¹⁵ "Treatment of Data Influenced by Exceptional Events; Final Guidance", FR Vol. 81, No. 191, 68279, October 3, 2016

¹⁶ Not all meteorological sites measure (sample) at the same heights or with the same instruments. For additional information regarding the monitor please refer to the indicated source of the information described below each table.

station does not have its own meteorological instruments, as does El Centro, Niland, and Westmorland.

TABLE 5-1
WIND SPEEDS AND PM₁₀ CONCENTRATIONS FOR BRAWLEY MARCH 28, 2016

EL CENTRO NAF (KNJK)				IMPERIAL CO AIRPORT (KIPL)				SUNRISE-OCOTILLO (IMPSD)				MOUNTAIN SPRINGS GRADE (TNSC1)				BRAWLEY FEM	
HOURL	W/S	W/D	W/G	HOURL	W/S	W/D	W/G	HOURL	W/S	W/D	W/G	HOURL	W/S	W/D	W/G	HOURL	PM ₁₀ (µg/m ³)
56	10	260		53	10	270		050	11	319	17	050	25	214	39	0000	31
156	13	260		153	13	260		150	15	318	22	150	32	205	44	0100	20
256	18	260		253	3	VR		250	12	271	21	250	32	212	44	0200	20
356	7	160		353	6	190		350	7	281	12	350	32	206	46	0300	22
456	6	130		453	6	170		450	12	234	19	450	31	205	49	0400	16
556	20	270		553	3	30		550	15	255	28	550	19	207	48	0500	36
656	24	250	31	653	13	250		650	26	249	41	650	20	227	36	0600	86
756	23	240	31	753	9	220		710	25	250	42	750	31	223	48	0700	350
856	25	260	32	853	17	260	28	850	6	344	17	850	31	216	52	0800	92
956	29	260	32	953	22	270	33	950	13	261	26	950	27	219	44	0900	503
1056	25	260	34	1053	26	290	38	1040	10	255	26	150	25	223	45	1000	278
1156	22	240	33	1153	28	250	33	1140	12	248	30	150	27	239	43	1100	480
1256	33	240	41	1253	25	250	37	1200	20	238	33	1250	27	229	44	1200	689
1354	36	240	43	1353	26	250	38	1320	13	257	33	1350	33	222	49	1300	555
1458	40	260	51	1453	22	260	34	1450	16	265	30	1450	32	235	51	1400	691
1558	39	250	49	1553	30	250	41	1540	22	277	35	1550	35	240	52	1500	995
1641	43	250	52	1653	29	250	40	1630	18	269	33	1650	34	239	54	1600	995
1737	38	240	47	1753	32	250	47	1730	17	271	32	1750	28	230	51	1700	698
1822	33	240	43	1853	32	250	41	1830	14	288	31	1850	29	224	47	1800	284
1956	29	240	38	1953	33	250	46	1950	19	268	38	1950	27	228	48	1900	327
2056	26	240	33	2053		M		2040	21	276	37	2050	28	244	43	2000	289
2156	29	240	38	2153	32s	250	51	2120	17	267	37	2150	24	239	42	2100	278
2256	28	240	37	2253	39	240	46	2250	17	266	32	2250	21	235	39	2200	153
2356	25	250	34	2353	28	250	34	2350	18	274	35	2350	29	240	40	2300	133

*Wind data for KIPL and KNJK from the NCEI's QCLCD system. Wind data for Sunrise Ocotillo (IMPSD) and Mountain Springs Grade (TNSC1) from the University of Utah's MesoWest system. Brawley station does not record wind data. Wind speeds = mph; Direction = degrees

TABLE 5-2
UPSTREAM WIND SPEEDS AND WESTMORLAND PM₁₀ CONCENTRATIONS MARCH 28, 2016

EL CENTRO NAF (KNJK)				IMPERIAL CO AIRPORT (KIPL)				SUNRISE-OCOTILLO (IMPSD)				WESTMORLAND				WESTMORLAND FEM	
HOURL	W/S	W/D	W/G	HOURL	W/S	W/D	W/G	HOURL	W/S	W/D	W/G	HOURL	W/S	W/D	W/G	HOURL	PM ₁₀ (µg/m ³)
56	10	260		53	10	270		050	11	319	17	0000	5.5	270		0000	26
156	13	260		153	13	260		150	15	318	22	0100	3.3	253		0100	18
256	18	260		253	3	VR		250	12	271	21	0200	5.2	279		0200	29
356	7	160		353	6	190		350	7	281	12	0300	3.1	219		0300	13
456	6	130		453	6	170		450	12	234	19	0400	2.6	235		0400	22
556	20	270		553	3	30		550	15	255	28	0500	2.8	231		0500	65
656	24	250	31	653	13	250		650	26	249	41	0600	4.8	254		0600	120
756	23	240	31	753	9	220		710	25	250	42	0700	5.4	256		0700	71
856	25	260	32	853	17	260	28	850	6	344	17	0800	4.9	265		0800	49
956	29	260	32	953	22	270	33	950	13	261	26	0900	7.8	249		0900	687
1056	25	260	34	1053	26	290	38	1040	10	255	26	1000	10.9	245		1000	619
1156	22	240	33	1153	28	250	33	1140	12	248	30	1100	10.9	242		1100	268
1256	33	240	41	1253	25	250	37	1200	20	238	33	1200	14.6	228		1200	618
1354	36	240	43	1353	26	250	38	1320	13	257	33	1300	15.6	225		1300	995
1458	40	260	51	1453	22	260	34	1450	16	265	30	1400	18.2	221		1400	995
1558	39	250	49	1553	30	250	41	1540	22	277	35	1500	18.2	224		1500	
1641	43	250	52	1653	29	250	40	1630	18	269	33	1600	18.1	225		1600	
1737	38	240	47	1753	32	250	47	1730	17	271	32	1700	16.9	228		1700	995
1822	33	240	43	1853	32	250	41	1830	14	288	31	1800	8.3	239		1800	553
1956	29	240	38	1953	33	250	46	1950	19	268	38	1900	5.3	240		1900	995
2056	26	240	33	2053		M		2040	21	276	37	2000	10.8	272		2000	995
2156	29	240	38	2153	32s	250	51	2120	17	267	37	2100	5.5	270		2100	995
2256	28	240	37	2253	39	240	46	2250	17	266	32	2200	3.3	253		2200	791
2356	25	250	34	2353	28	250	34	2350	18	274	35	2300	5.2	279		2300	312

*Wind data for KIPL and KNJK from the NCEI's QCLCD system. Westmorland does not record gusts. Wind data for Sunrise Ocotillo (IMPSD) from the University of Utah's MesoWest system. Wind and air quality data for Westmorland from the EPA's AQS data bank. Wind speeds = mph; Direction = degrees

TABLE 5-3
WIND SPEEDS AND PM₁₀ CONCENTRATIONS FOR EL CENTRO MARCH 28, 2016

EL CENTRO NAF (KNJK)				IMPERIAL CO AIRPORT (KIPL)				SUNRISE-OCOTILLO (IMPSD)				EL CENTRO				EL CENTRO FEM	
HOURL	W/S	W/D	W/G	HOURL	W/S	W/D	W/G	HOURL	W/S	W/D	W/G	HOURL	W/S	W/D	W/G	HOURL	PM ₁₀ (µg/m ³)
56	10	260		53	10	270		050	11	319	17	0000	6.6	271		0000	21
156	13	260		153	13	260		150	15	318	22	0100	9.5	272		0100	25
256	18	260		253	3	VR		250	12	271	21	0200	2.7	206		0200	23
356	7	160		353	6	190		350	7	281	12	0300	2.6	197		0300	37
456	6	130		453	6	170		450	12	234	19	0400	2.6	173		0400	22
556	20	270		553	3	30		550	15	255	28	0500	1.5	96		0500	33
656	24	250	31	653	13	250		650	26	249	41	0600	0.5	114		0600	61
756	23	240	31	753	9	220		710	25	250	42	0700	1	151		0700	38
856	25	260	32	853	17	260	28	850	6	344	17	0800	10.8	263		0800	175
956	29	260	32	953	22	270	33	950	13	261	26	0900	13.8	278		0900	109
1056	25	260	34	1053	26	290	38	1040	10	255	26	1000	9.8	269		1000	82
1156	22	240	33	1153	28	250	33	1140	12	248	30	1100	15.9	254		1100	152
1256	33	240	41	1253	25	250	37	1200	20	238	33	1200	15.6	257		1200	54
1354	36	240	43	1353	26	250	38	1320	13	257	33	1300	17.9	254		1300	110
1458	40	260	51	1453	22	260	34	1450	16	265	30	1400	16.9	257		1400	132
1558	39	250	49	1553	30	250	41	1540	22	277	35	1500	15.9	257		1500	250
1641	43	250	52	1653	29	250	40	1630	18	269	33	1600	14.8	254		1600	408
1737	38	240	47	1753	32	250	47	1730	17	271	32	1700	13.7	255		1700	995
1822	33	240	43	1853	32	250	41	1830	14	288	31	1800	15.8	253		1800	995
1956	29	240	38	1953	33	250	46	1950	19	268	38	1900	18.7	254		1900	890
2056	26	240	33	2053		M		2040	21	276	37	2000	14.2	240		2000	467
2156	29	240	38	2153	32s	250	51	2120	17	267	37	2100	14	245		2100	422
2256	28	240	37	2253	39	240	46	2250	17	266	32	2200	22.5	262		2200	995
2356	25	250	34	2353	28	250	34	2350	18	274	35	2300	22.8	264		2300	342

*Wind data for KIPL and KNJK from the NCEI's QCLCD system. El Centro does not record gusts. Wind data for Sunrise Ocotillo (IMPSD) from the University of Utah's MesoWest system. Wind and air quality data for Westmorland from the EPA's AQS data bank. Wind speeds = mph; Direction = degrees

TABLE 5-4
WIND SPEEDS AND PM₁₀ CONCENTRATIONS FOR NILAND MARCH 28, 2016

EL CENTRO NAF (KNJK)				IMPERIAL CO AIRPORT (KIPL)				NAVAL TEST BASE				NILAND (ENGLISH RD)				NILAND (ENGLISH RD) FEM	
HOURL	W/S	W/D	W/G	HOURL	W/S	W/D	W/G	HOURL	W/S	W/D	W/G	HOURL	W/S	W/D	W/G	HOURL	PM ₁₀ (µg/m ³)
56	10	260		53	10	270		0000	18	256		0000	6.6	271		0000	25
156	13	260		153	13	260		0100	15	247		0100	9.5	272		0100	15
256	18	260		253	3	VR		0200	10	229		0200	2.7	206		0200	21
356	7	160		353	6	190		0300				0300	2.6	197		0300	28
456	6	130		453	6	170		0400				0400	2.6	173		0400	50
556	20	270		553	3	30		0500				0500	1.5	96		0500	58
656	24	250	31	653	13	250		0600	25	256		0600	0.5	114		0600	58
756	23	240	31	753	9	220		0700	33	254		0700	1	151		0700	144
856	25	260	32	853	17	260	28	0800	26	249		0800	10.8	263		0800	97
956	29	260	32	953	22	270	33	0900	25	244		0900	13.8	278		0900	132
1056	25	260	34	1053	26	290	38	1000	24	240		1000	9.8	269		1000	99
1156	22	240	33	1153	28	250	33	1100	24	243		1100	15.9	254		1100	237
1256	33	240	41	1253	25	250	37	1200	24	246		1200	15.6	257		1200	103
1354	36	240	43	1353	26	250	38	1300	22	237		1300	17.9	254		1300	162
1458	40	260	51	1453	22	260	34	1400	31	244		1400	16.9	257		1400	617
1558	39	250	49	1553	30	250	41	1500	32	248		1500	15.9	257		1500	995
1641	43	250	52	1653	29	250	40	1600	36	253		1600	14.8	254		1600	
1737	38	240	47	1753	32	250	47	1700	41	253		1700	13.7	255		1700	
1822	33	240	43	1853	32	250	41	1800	35	253		1800	15.8	253		1800	995
1956	29	240	38	1953	33	250	46	1900				1900	18.7	254		1900	
2056	26	240	33	2053		M		2000				2000	14.2	240		2000	899
2156	29	240	38	2153	32s	250	51	2100				2100	14	245		2100	995
2256	28	240	37	2253	39	240	46	2200	32	244		2200	22.5	262		2200	949
2356	25	250	34	2353	28	250	34	2300	18	256		2300	22.8	264		2300	

*Wind data for KIPL and KNJK from the NCEI's QCLCD system. Niland does not record gusts. Wind data for Naval Test Base from AQMIS2. Wind and air quality data for Niland from the EPA's AQS data bank. Wind speeds = mph; Direction = degrees

Figure 5-5 graphically depicts a 6-hour HYSPLIT back-trajectory ending at 1500 PST along with key wind factors at upstream sites. It was not just the speed of winds that was a factor in the March 28, 2016 exceedance at the Brawley, El Centro, Niland, and Westmorland monitors but the duration of those winds.

Winds blew over and through the San Diego mountains, canyons and desert slopes west of Imperial County. The desert slope station at Mountain Springs Grade (elev. 2,044 ft; MesoWest Station ID TNSC1) measured 20 hours of winds at or above the 25-mph threshold. From 0050 PST through 2350 PST on March 28, 2016 the site did not measure gusts below 36 mph. The measured peak gust was 54 mph. The high winds blew through the San Diego Mountains and down the desert slopes into Imperial County.

Other meteorological monitors located west of Imperial County measured elevated wind speeds and gust. For example, the Sunrise-Ocotillo (elev. 695 ft; MesoWest Station ID IMPSD) monitor measured two hours of winds above the 25-mph threshold and 14 hours of gusts at or above 30 mph. The Fish Creek Mountains measured 13 hours of gusts at or above 25 mph. As entrained windblown dust entered Imperial County, the El Centro NAF (KNJK) reported six observations of heavy dust storms from 1403 through 1641 PST. Further north, the Naval Test Base measured 10 hours of winds at or above the 25-mph wind threshold. Peaks winds reached 41 mph (some hours were missing). Winds at the Niland station also easily exceeded the 25-mph threshold. Peak

winds were over 38 mph.

FIGURE 5-5
EXCEEDANCE TIMELINE

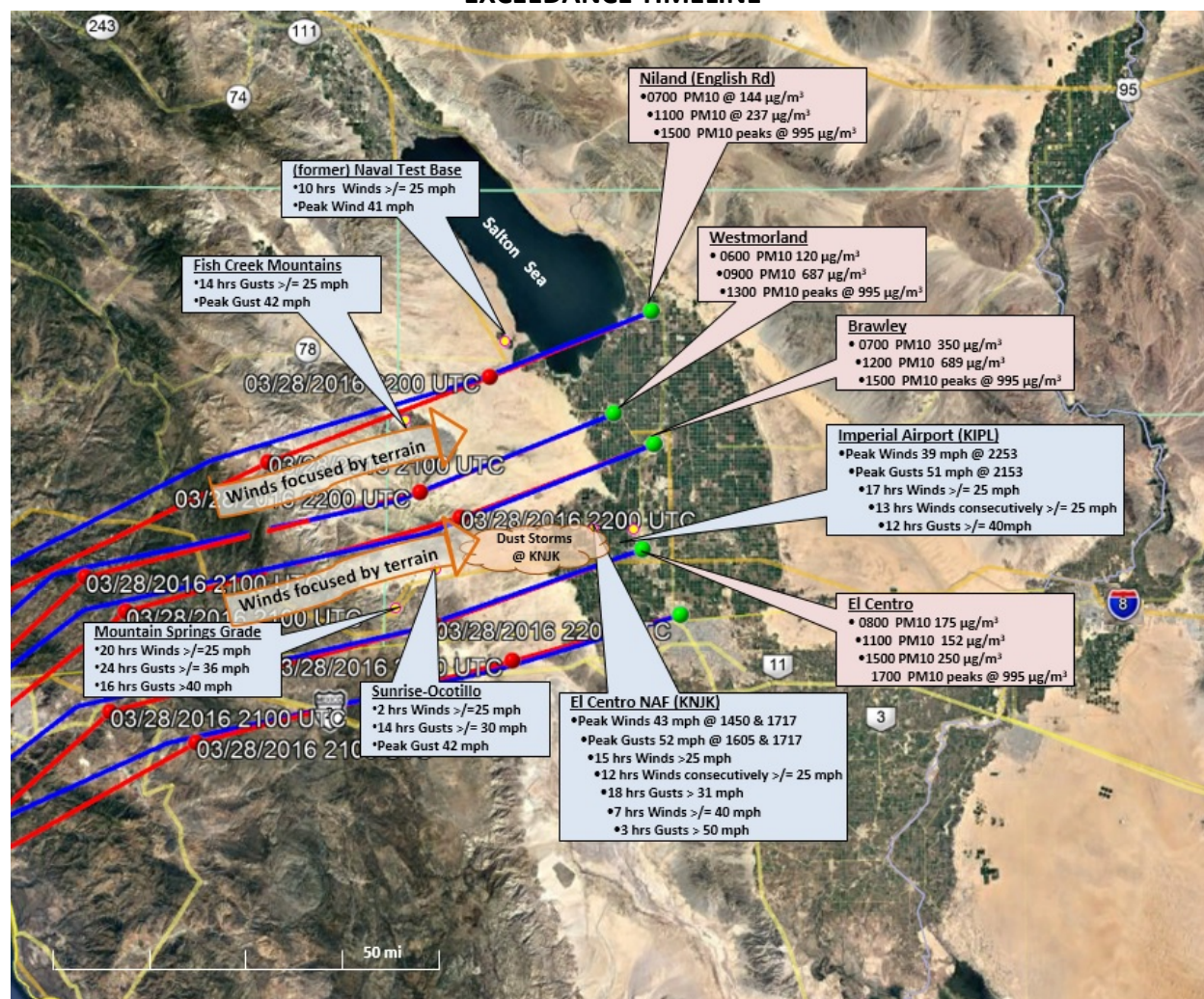


Fig 5-5: A 6-hour HYSPLIT back-trajectory ending at 1500 PST illustrated that air flow over and through the San Diego Mountains, over the natural open desert floor toward the Brawley (green icon), El Centro (blue icon), and Westmorland (red icon) monitors. Winds not only exceeded 40 mph at some upstream locations, but winds and gusts continued unrelenting for the better part of the day. Red trajectory indicates airflow at 10 meters AGL (above ground level); blue indicates airflow at 100 m. Trajectory times are for 10 m airflow. Yellow line indicates the international border. Aqua lines denote county boundaries. Dynamically generated through NOAA's Air Resources Laboratory HYSPLIT model. Base map from Google Earth

Figures 5-6 through 5-9 depict PM₁₀ concentrations and wind speeds over a 72-hour period at the Brawley, El Centro, Niland, and Westmorland monitors. Fluctuations in hourly concentrations over 72 hours show a positive correlation with wind speeds, particularly with gusts.

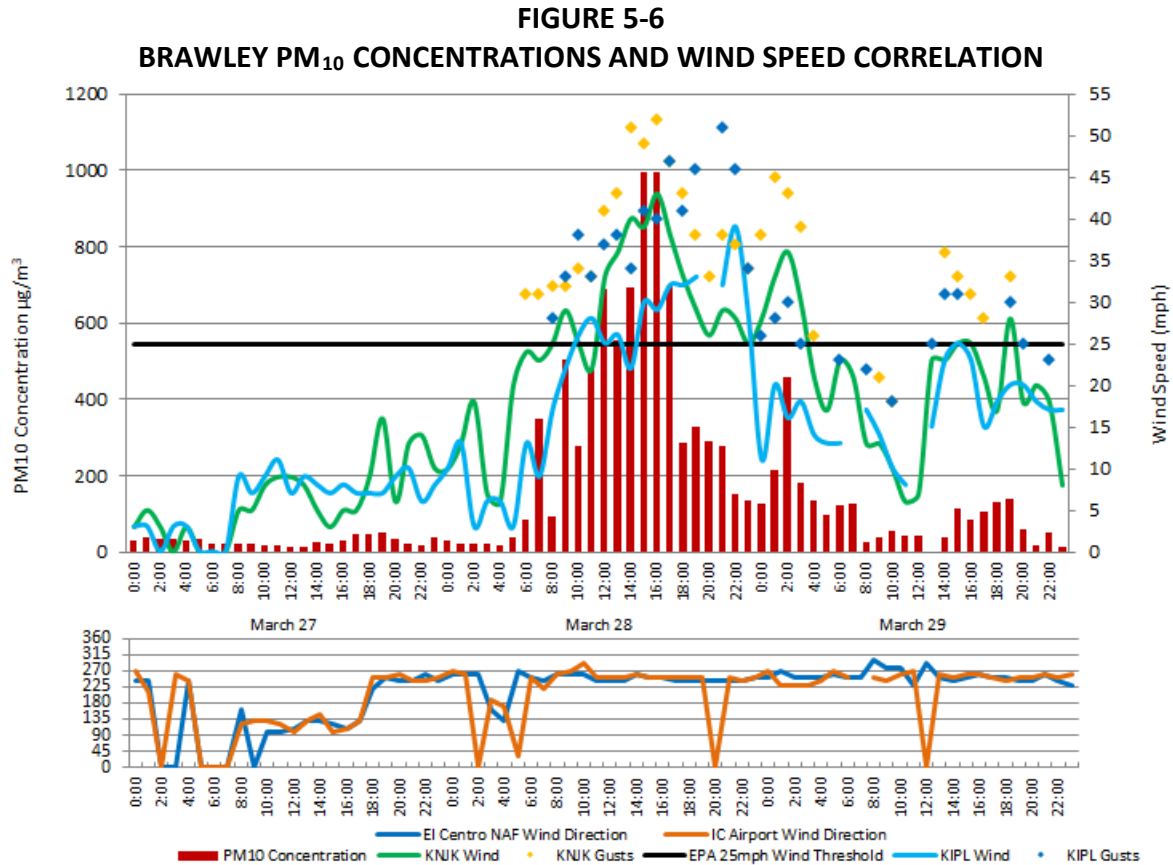


Fig 5-6: Fluctuations in hourly concentrations over 72 hours show a positive correlation with wind speeds particularly with gusts, at the Imperial County Airport (KIPL) and El Centro NAF (KNJKL). Lower wind speeds coincided with a brief shift in wind directions. The Brawley station does not measure wind speed or direction. Black line indicates 25 mph threshold. Air quality data from the EPA's AQS data bank. Wind data from the NCEI's QCLCD system

FIGURE 5-7
EL CENTRO PM₁₀ CONCENTRATIONS AND WIND SPEED CORRELATION

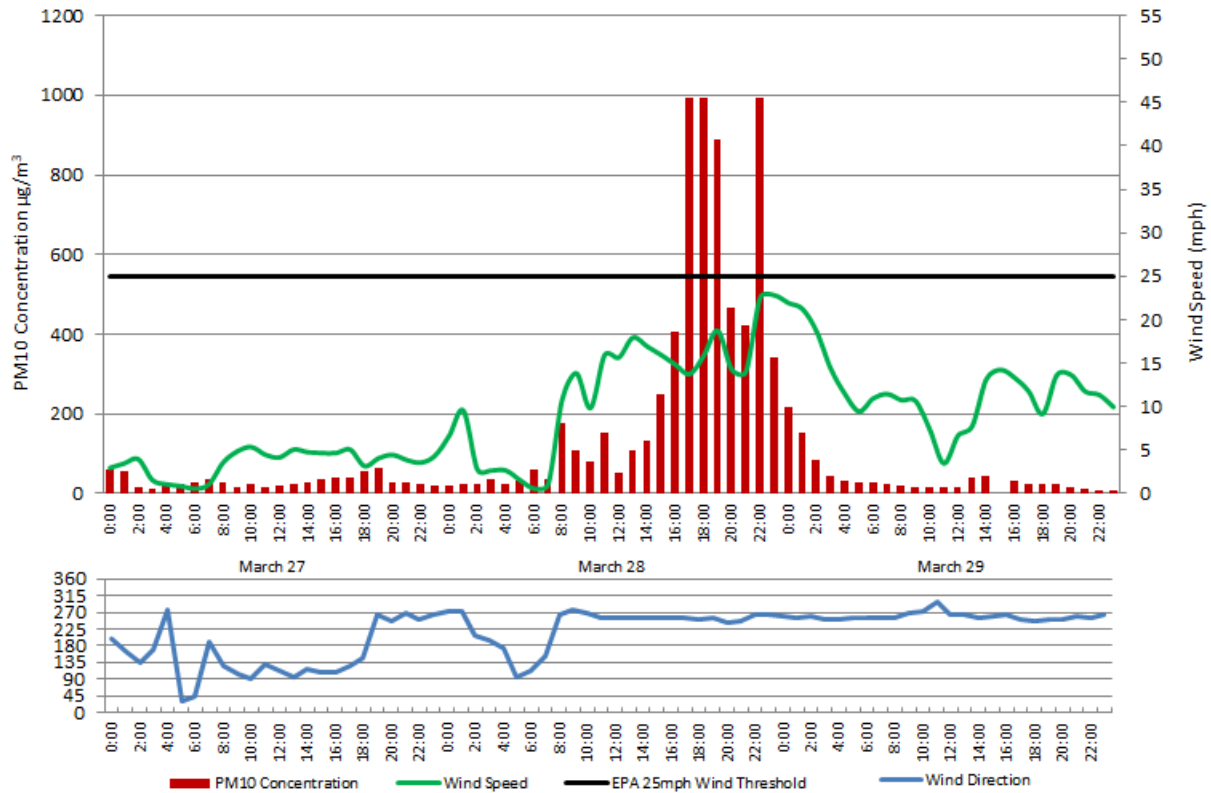


Fig 5-7: Measured wind speeds at the El Centro air monitoring station were just under the 25mph threshold. Analysis indicates that as winds blew into the urbanized areas, buildings and other obstructions caused a deflection of winds. Air quality and wind data from the EPA's AQS data bank

FIGURE 5-8
NILAND PM₁₀ CONCENTRATIONS AND WIND SPEED CORRELATION

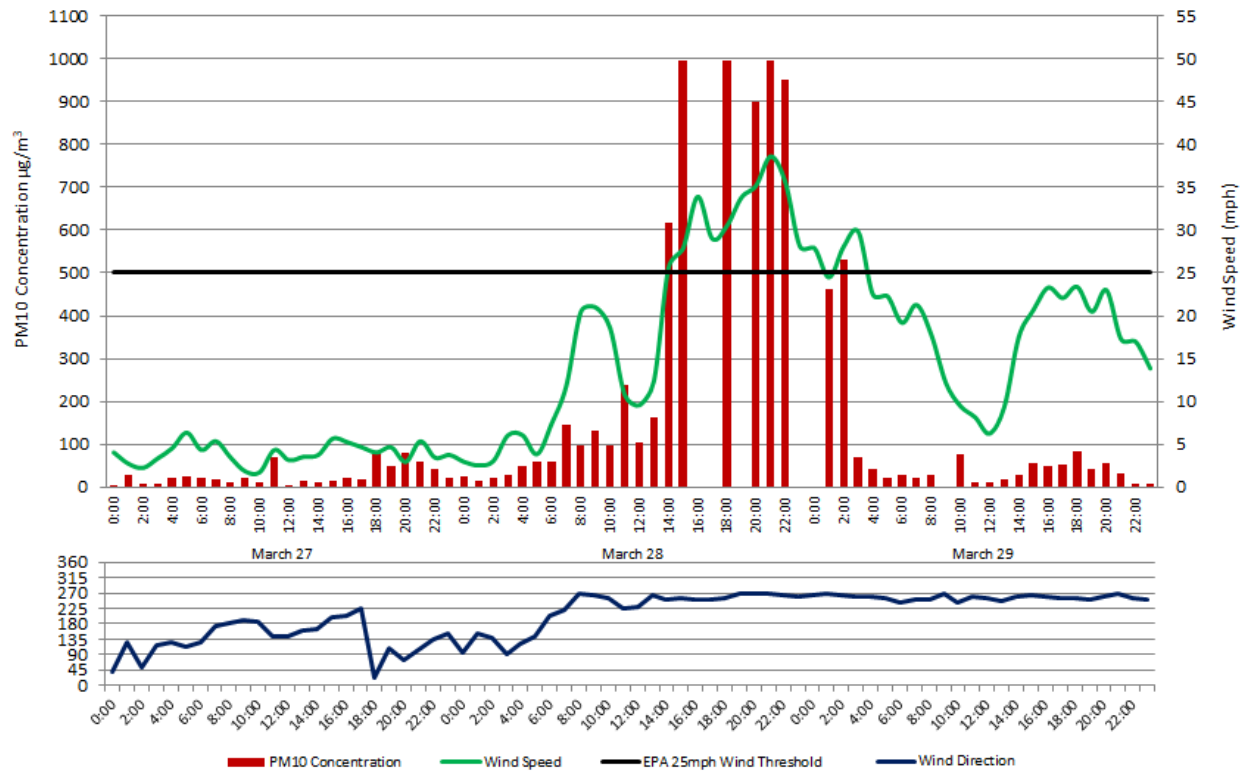


Fig 5-8: Measured wind speeds at Niland air monitoring station were well above the 25mph wind threshold. Air quality and wind data from the EPA's AQS data bank

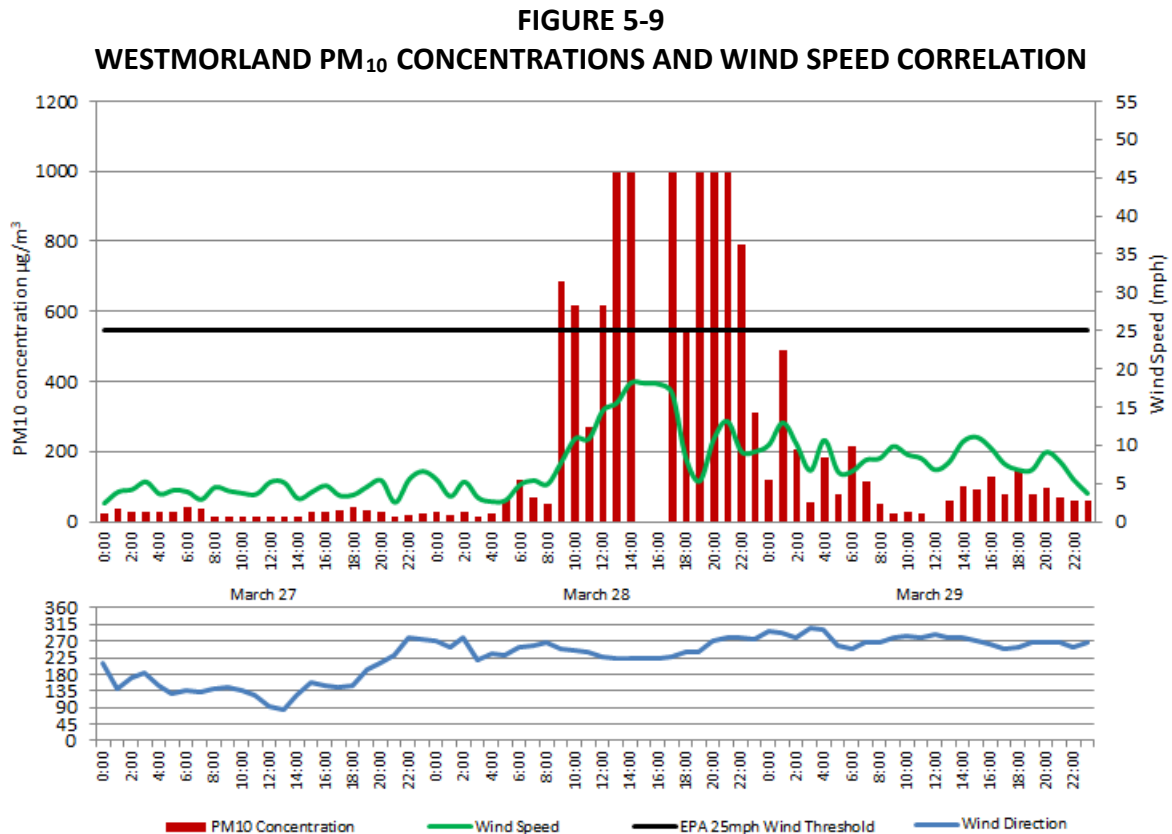


Fig 5-9: Measured wind speeds at the Westmorland air monitoring station were below the 25mph wind threshold. While the Westmorland air monitoring station does not measure wind gusts, an important element in the transport of windblown dust the lower level winds would have allowed the deposition of dust particles onto the Westmorland monitor. Air quality and wind data from the EPA's AQS data bank

Figure 5-10 is a combined graph of PM₁₀ concentrations at the Brawley, El Centro, Niland, and Westmorland monitors over a 72-hour period. The graph provides upstream wind speeds. As indicated in the graph winds measured above the 25 mph threshold as did measured wind gusts, which played a critical role in transporting windblown dust into Imperial County affecting air quality and causing an exceedance of the NAAQS.

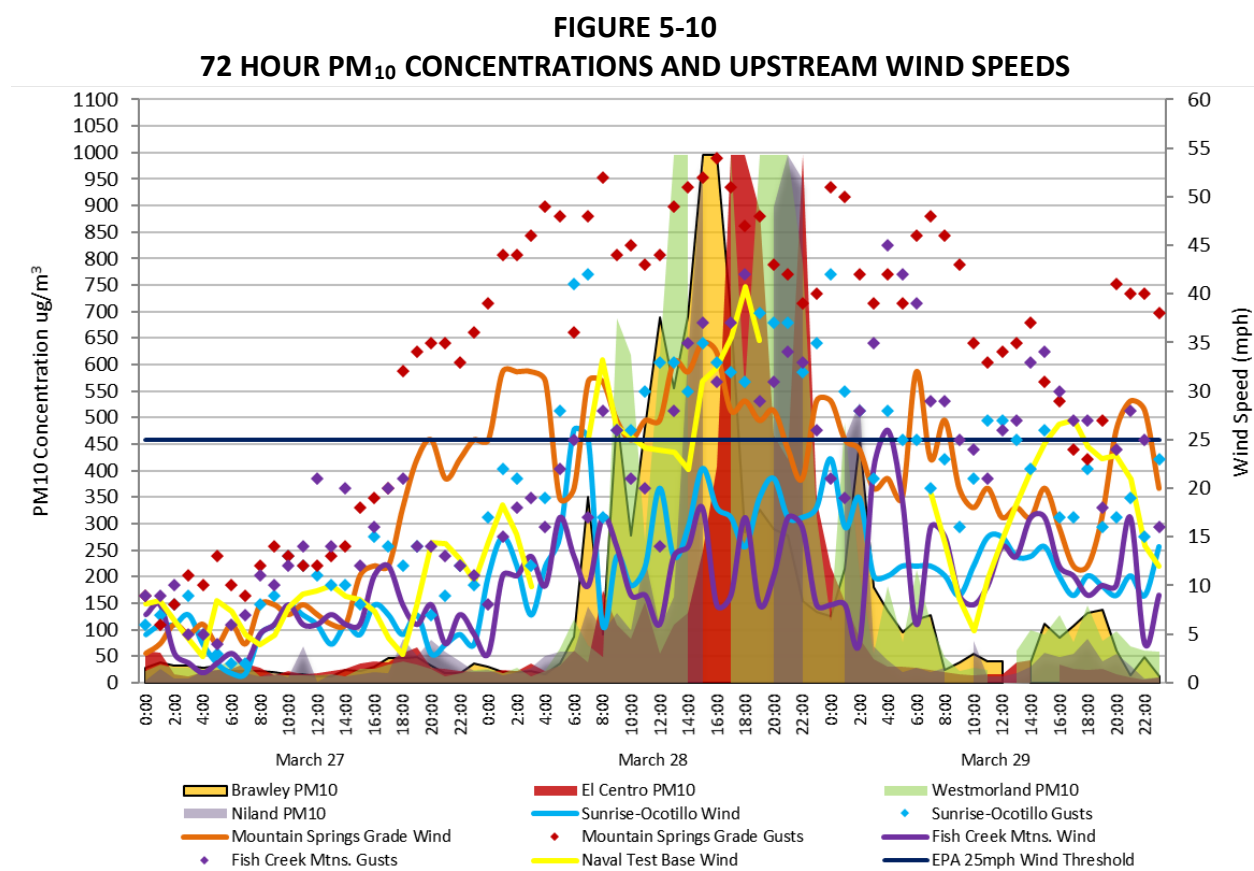


Fig 5-10: An increase in winds and particularly gusts at upstream sites led to an increase in PM₁₀ concentrations as transported windblown dust affected air quality and caused an exceedance of the NAAQS in Imperial County. Air quality data from the EPA's AQS data bank. Wind data from the University of Utah's MesoWest

Figure 5-11 compares the 72-hour concentrations at the Brawley, Calexico, El Centro, Niland, and Westmorland monitors over a 72-hour period between March 27, 2016 and March 29, 2016. Visibility¹⁷ at the Imperial County Airport (KIPL) and the El Centro NAF (KNJK) reduced significantly coincident with significantly elevated measured concentrations at the monitors downstream. This provides analytical support that transported windblown dust blew downwind and affected air quality downstream.

¹⁷ According to the NWS there is a difference between human visibility and the visibility measured by an Automated Surface Observing System (ASOS) or an Automated Weather Observing System (AWOS). The automated sensors measure clarity of the air vs. how far one can "see". The more moisture, dust, snow, rain, or particles in the light beam the more light scattered. The sensor measures the return every 30 seconds. The visibility value transmitted is the average 1-minute value from the past 10 minutes. The sensor samples only a small segment of the atmosphere, 0.75 feet therefore an algorithm is used to provide a representative visibility. Siting of the visibility sensor is critical and large areas should provide multiple sensors to provide a representative observation; <http://www.nws.noaa.gov/asos/vsby.htm>

FIGURE 5-11
72 HOUR PM₁₀ CONCENTRATIONS AND VISIBILITY

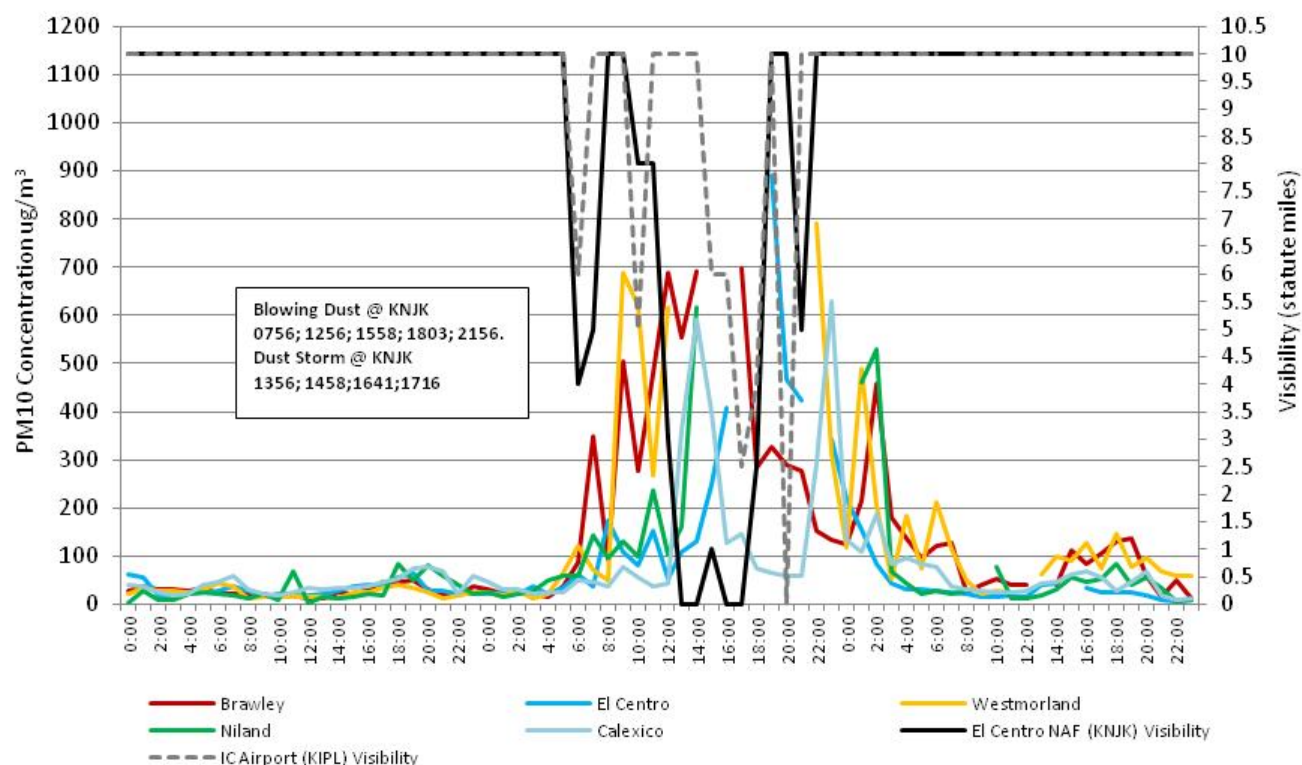


Fig 5-11: Visibility as reported from the El Centro NAF (KNJK) and the Imperial County Airport (KIPL) indicates that visibility reduced significantly at KIPL prior to measured peak concentrations at the Brawley, Westmorland, and Niland monitors. Visibility data from the NCEI's QCLCD data bank

A useful tool when identifying the effect upon air quality by an event is the Air Quality Index (AQI)¹⁸. **Figures 5-12 through 5-14** show the AQI for Brawley, El Centro and Westmorland and help explain the level of effect upon air quality by the event on March 28, 2016. When the AQI levels change from Good or “Green” progressively to an Unhealthy level or “Red” as it did in Brawley on March 28, 2016, one can reasonably discern the level of degradation of air quality in Imperial County on March 28, 2016. The AQI for both El Centro and Westmorland, similarly progressively changed to Unhealthy for Sensitive Groups or “Orange.”

¹⁸ The AQI is an index for reporting daily air quality. It tells you how clean or polluted your air is, and what associated health effects might be a concern for you. The AQI focuses on health affects you may experience within a few hours or days after breathing polluted air. EPA calculates the AQI for five major air pollutants regulated by the Clean Air Act: ground-level ozone, particle pollution (also known as particulate matter), carbon monoxide, sulfur dioxide, and nitrogen dioxide. For each of these pollutants, EPA has established national air quality standards to protect public health. Ground-level ozone and airborne particles are the two pollutants that pose the greatest threat to human health in this country. Source: <https://airnow.gov/index.cfm?action=aqibasics.aqi>

FIGURE 5-12
AIR QUALITY INDEX FOR BRAWLEY MARCH 28, 2016

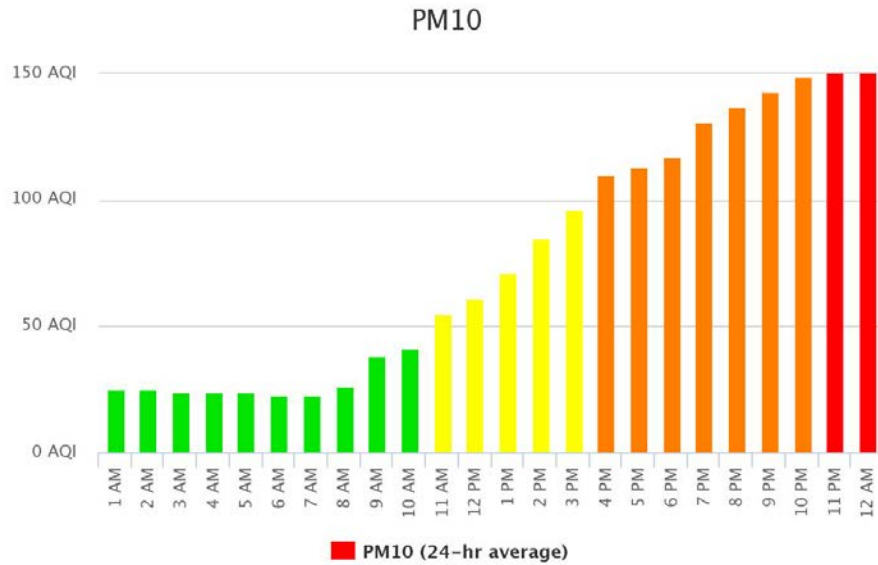


Fig 5-10: Demonstrates that air quality in Imperial County reduced or degraded as high gusty westerly winds blew through California on March 28, 2016 transporting windblown dust into Imperial County. Source: ICAPCD archives

FIGURE 5-13
AIR QUALITY INDEX IN EL CENTRO MARCH 28, 2016

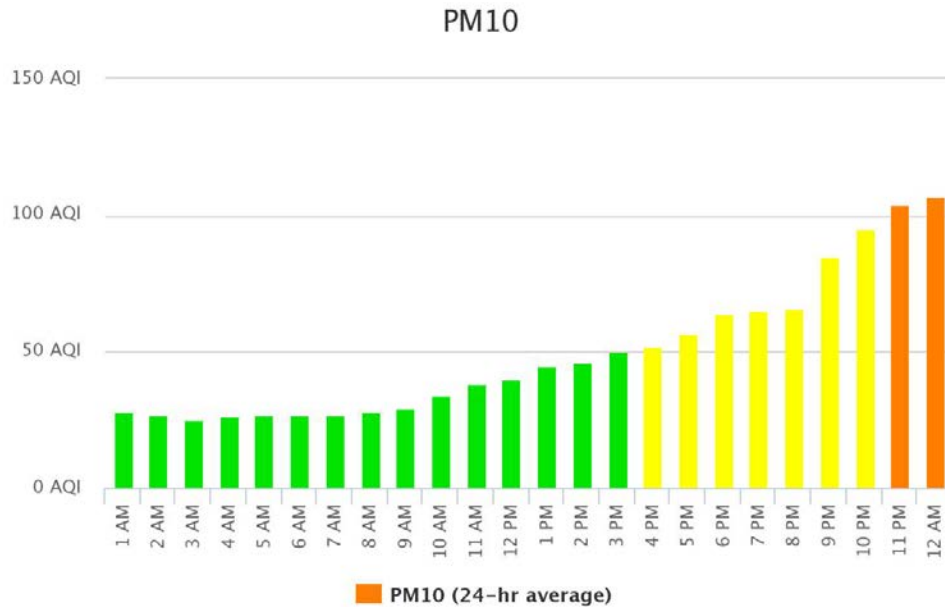


Fig 5-13: Demonstrates that air quality in Imperial County reduced or degraded as high gusty westerly winds blew through California on March 28, 2016 transporting windblown dust into Imperial County. Source: ICAPCD archives

FIGURE 5-14
AIR QUALITY INDEX IN WESTMORLAND MARCH 28, 2016

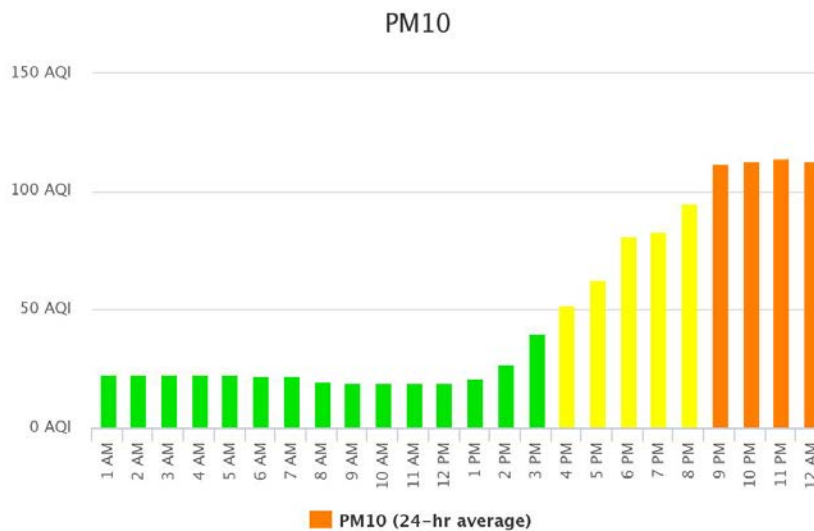


Fig 5-14: Demonstrates that air quality in Imperial County reduced or degraded as high gusty westerly winds blew through California on March 28, 2016 transporting windblown dust into Imperial County. Source: ICAPCD archives

V.2 Summary

The preceding discussion, graphs, figures and tables provide wind direction, wind speed and PM₁₀ concentration data illustrating the spatial and temporal representation of the gusty west winds that were associated with a low-pressure system that tightened the surface gradient leading to many hours of powerful winds across southeastern California and Imperial County. The information provides a clear causal relationship between the entrained windblown dust and the PM₁₀ exceedance measured at the Brawley, El Centro, Niland, and Westmorland monitors on March 28, 2016. Furthermore, the advisories and air quality index illustrate the affect upon air quality within the region extending from the mountains and desert slopes of San Diego County, all of Imperial County and the southern portion of Riverside County. Large amounts of coarse particles (dust) and PM₁₀ were carried aloft by strong westerly winds into the lower atmosphere causing a change in the air quality conditions within Imperial County. The entrained dust originated from as far as the mountains and desert slope areas located within San Diego County and Imperial County (part of the Sonoran Desert). Combined, the information demonstrates that the elevated PM₁₀ concentrations measured on March 28, 2016 coincided with high wind speeds and that gusty west winds were experienced over the southern portion of Riverside County, southeastern San Diego County, all of Imperial County, and parts of Arizona.

FIGURE 5-15 MARCH 28, 2016 WIND EVENT TAKE AWAY POINTS

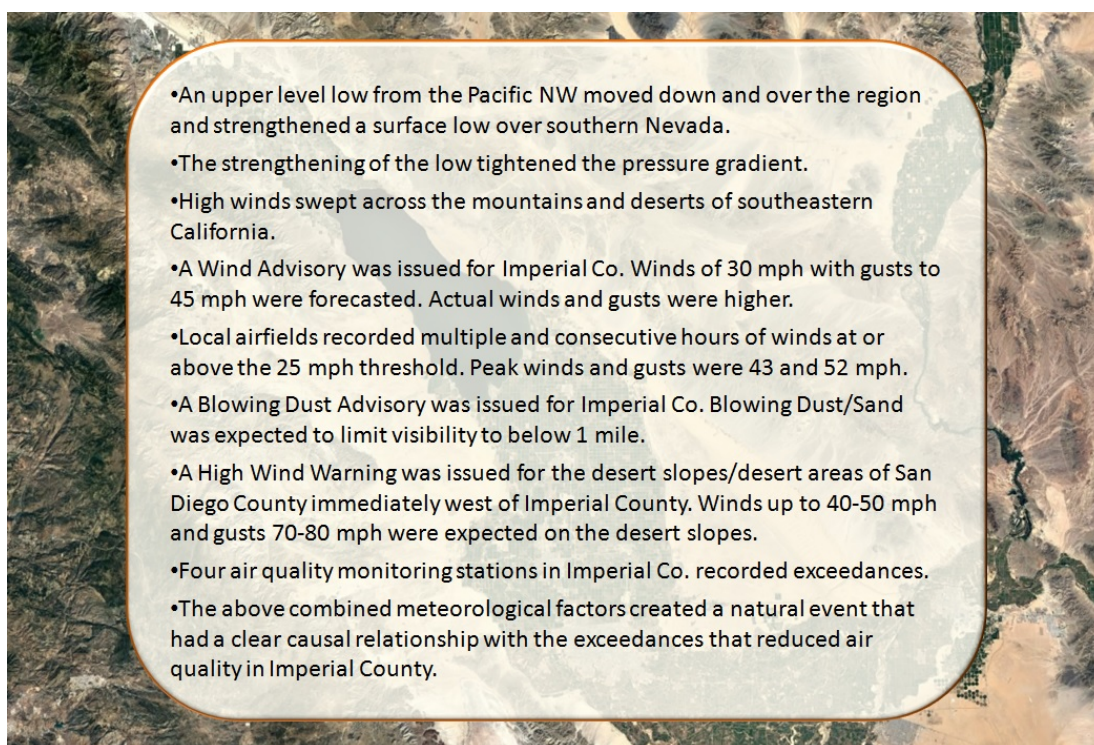


Fig 5-15: Illustrates the factors that qualify the March 28, 2016 natural event which affected air quality as an Exceptional Event

VI Conclusions

The PM₁₀ exceedance that occurred on March 28, 2016, satisfies the criteria of the EER, which states that in order to justify the exclusion of air quality monitoring data evidence must be provided for the following elements:

TABLE 6-1 TECHNICAL ELEMENTS CHECKLIST		
EXCEPTIONAL EVENT DEMONSTRATION FOR HIGH WIND DUST EVENT (PM ₁₀)		DOCUMENT SECTION
1	A narrative conceptual model that describes the event(s) causing the exceedance or violation and a discussion of how emissions from the event(s) led to the exceedance or violation at the affected monitor(s)	5-29
2	A demonstration that the event affected air quality in such a way that there exists a clear causal relationship between the specific event and the monitored exceedance or violation	52-69, 70
3	Analyses comparing the claimed event-influenced concentration(s) to concentrations at the same monitoring site at other times to support the requirement at paragraph (c)(3)(iv)(B) of this section	30-43, 71
4	A demonstration that the event was both not reasonably controllable and not reasonably preventable	44-51, 70
5	A demonstration that the event was a human activity that is unlikely to recur at a particular location or was a natural event	52-69, 71

VI.1 Affects Air Quality

The preamble to the revised EER states that an event has affected air quality if the event affected air quality in such a way that there exists a clear causal relationship between the specific event and the monitored exceedance or violation. Given the information presented in this demonstration, particularly Section V, we can reasonably conclude that there exists a clear causal relationship between the monitored exceedance and the March 28, 2016 event, which changed or affected air quality in Imperial County.

VI.2 Not Reasonably Controllable or Preventable

Section 50.1(j) of 40 CFR Part 50 defines an exceptional event as an event that must be “not reasonably controllable or preventable” (nRCP). The revised preamble explains that the nRCP has two prongs, not reasonably preventable and not reasonably controllable. A natural wind event, which transports dust from natural open deserts, meets the nRCP, when sources are controlled by BACM and when human activity plays little to no direct causal role. This demonstration provides evidence that despite BACM in place within Imperial County, strong

gusty west winds overwhelmed all BACM controls where human activity played little to no direct causal role. The PM₁₀ exceedance measured at the Brawley, El Centro, Niland and Westmorland monitors caused by naturally occurring strong gusty westerly winds transported windblown dust into Imperial County and other parts of southern California from areas located within the San Diego Mountains. These facts provide strong evidence that the PM₁₀ exceedance at the Brawley, El Centro, Niland and Westmorland monitors on March 28, 2016, were not reasonably controllable or preventable.

VI.3 Natural Event

The revised preamble to the EER clarifies that a “Natural Event” (50.1(k) of 40 CFR Part 50) is an event which may recur at the same location, with its resulting emissions where human activity played little or no direct causal role. Anthropogenic sources that are reasonably controlled are considered not to play a direct role in causing emissions. As discussed within this demonstration, the PM₁₀ exceedances that occurred at the Brawley, El Centro, Niland and Westmorland monitors on March 28, 2016, were caused by the transport of fugitive windblown dust into Imperial County by strong gusty westerly winds associated with the passage of low-pressure system and accompanying trough that moved through the region. At the time of the event, anthropogenic sources were reasonably controlled with BACM. The event therefore qualifies as a natural event.

VI.4 Clear Causal Relationship

The time series plots of PM₁₀ concentrations at the Brawley, El Centro, Niland and Westmorland monitors during different days, and the comparative analysis of different monitors in Imperial and Riverside counties demonstrates a consistency of elevated gusty west winds and concentrations of PM₁₀ on March 28, 2016 (Section V). In addition, these time series plots and graphs demonstrate that the high PM₁₀ concentrations and the gusty west winds were an event that was widespread, regional and not preventable. Arid conditions preceding the event resulted in soils that were particularly susceptible to particulate suspension by the elevated gusty west winds. Days immediately before and after the high wind event PM₁₀ concentrations were well below the NAAQS. Overall, the demonstration provides evidence of the strong correlation between the natural event and the windblown fugitive emissions to the exceedances on March 28, 2016.

VI.5 Historical Concentrations

The historical annual and seasonal 24-hr average PM₁₀ values measured at the Brawley, El Centro, Niland and Westmorland monitors were historically unusual compared to a multi-year data set (Section III).

Appendix A: Public Notification that a potential event was occurring (40 CFR §50.14(c)(1))

This section contains wind advisories issued by the National Weather Service and Imperial County on or around March 28, 2016. In addition, this Appendix contains the air quality alert issued by

Imperial County advising sensitive receptors of potentially unhealthy conditions in Imperial County resulting from the strong gusty winds. The data show a region-wide increase in wind speeds and wind gusts coincident with the arrival of dust and high PM₁₀ concentrations in Imperial County.

Appendix B: Meteorological Data.

This Appendix contains the time series plots, graphs, wind roses, etc. for selected monitors in Imperial and Riverside Counties. These plots, graphs and tables demonstrate the regional impact of the wind event.

Appendix C: Correlated PM₁₀ Concentrations and Winds.

This Appendix contains the graphs depicting the correlations between PM₁₀ Concentrations and elevated wind speeds for selected monitors in Imperial and Riverside Counties. These graphs demonstrate the region wide impact of the wind event.

Appendix D: Regulation VIII – Fugitive Dust Rule.

This Appendix contains the compilation of the BACM adopted by the Imperial County Air Pollution Control District and approved by the United States Environmental Protection Agency. A total of seven rules numbered 800 through 806 comprise the set of Regulation VIII Fugitive Dust Rules.